Honeywell

Wireless Temperature Transmitter
User Manual
Americas

900 MHz ISM Band

XYR 5000 Line
34-XY-25-02
Rev. 8
July 2012

Wireless Temperature Transmitter
Models WT531 and WT532

Versions 1.70 or later

⚠ Important Information to the User ⚠

- Changes or modifications not expressly approved by the manufacturer may void the user's authority to operate the equipment.
- This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: 1) this device may not cause harmful interference, and 2) this device must accept any interference received, including interference that may cause undesired operation.
- This device is for mobile and fixed use only (not portable or body-worn). A separation distance of 20cm must be maintained at all times between the antenna and the body of the user and bodies of nearby persons.
- If the Wireless Management Toolkit (RF Server) software is shutdown, the RS-485 network **MUST be physically disconnected** from the PC as the serial port is no longer being controlled by the software and may disrupt communications between the Base Radio(s) and Analog/Digital Output Module(s).
- This device has been designed to operate with an antenna having a maximum gain of 9 dBd. Antenna having a higher gain is strictly prohibited per regulations of Industry Canada. The required antenna impedance is 50 ohms.
- To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that required for successful communication.
- The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada's website www.hc-sc.gc.ca/rpb.

⚠ FCC Certification ⚠

- This product is a frequency hopping RF transceiver module for the 900MHz ISM band, designed to meet FCC 15.247, and is used in industrial control and monitoring applications.
- The antenna is factory installed and **MUST NOT** be removed or modified by user.

Honeywell Process Solutions

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About This Document

Revision Notes

The following list provides notes concerning all revisions of this document.

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34-XY-25-02	Rev. 1	02/04	2nd issue of document.
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34-XY-25-02	Rev. 6	08/08	Updated dimensions.
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Contacts

World Wide Web

The following is a list of Honeywell contacts for including Internet World Wide Web, Telephone, Fax and Email.

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Introduction

1.1: USING THIS MANUAL

This manual is designed to assist in installing, operating, and maintaining Honeywell Model WT531T and WT531R Temperature Transmitters. The manual is broken into sections as follows:

Section 2: Quick Start
This section summarizes what must be done in order to get the device installed, configured, and in operation quickly. However, it does not provide detailed or how-to information to perform the tasks outlined.

Section 3: Installation
This section explains how to correctly wire the Thermocouple/RTD Inputs, Input Switches, and ground the Transmitter. Also covered in this section are mechanical installation considerations; such as Transmitter placement.

Section 4: General Configuration
In this section, general configuration options such as password protection and selecting a user password are discussed. Also covered is the setting of a Transmitter tag name, resetting of all Transmitter settings, and a discussion of the various messages that are displayed on the Transmitter LCD.

Section 5: Configuring the RF Communications
This section covers the setup of the Transmitter RF Communications that allow the Transmitter to achieve communication with the Base Radio. Parameters discussed are the Transmitter RF ID, the RF channel setting and Baud Rate.

Section 6: Configuring the Sampling and Transmission Rates
This section aids the user in selecting the amount of time between each sample of the process, and the time between each transmission of this sample to the Base Radio. Also discussed is the use of setting an abnormal threshold in which sampling and transmission times may change during a period when the process variable is within the abnormal region.

Section 7: Configuring the Process Variable
This section helps the user select engineering units and discusses setting a measurement offset and trimming the process measurement.

Section 8: Maintaining the Transmitter
This section explains how the Transmitter should be cared for once it has been placed into service and how to change the battery.

Section 9: Technical Specifications
This section explains the technical specifications that are associated with this device such as power characteristics, accuracy, and operating characteristics.

1.2: ABOUT THE DEVICE

The Honeywell Temperature Transmitter is a reliable Radio Frequency (RF) transceiver coupled with an temperature input sensor that can be used to monitor a variety of processes in hazardous and hard-to-reach areas. The time and expense of running wires often makes it difficult to measure parameters that have an economic impact on your plant operation, but the Temperature Transmitter allows you to quickly and accurately monitor those devices at a fraction of the cost, which gives you bigger and faster returns on your instrumentation investments.

The Transmitters communicate in a secure, digital protocol over a band of frequencies from 902MHz to 928MHz. This data communication technique has been the backbone of the military's secure communications protocols for many years. These devices require no wires, permits or licenses, and they are easily set up and installed right out of the box.

You can use this device for long term monitoring in remote locations, for short-term data gathering on process conditions, or to quickly test the economic viability of a new installation.

The purpose of this manual is to help you install and maintain your Honeywell Temperature Transmitter. BEFORE setting up and installing the Transmitter please setup and configure the Base Radio.

1.3: UNPACKING

Remove the Packing List and check off the actual equipment received. If you have any questions about your shipment, please call your Honeywell Representative. Upon receipt of the shipment, inspect the container for any signs of damage in transit. Especially take note of any evidence of rough handling. Report any apparent damage immediately to the shipping agent.

Please note that sometimes units are assembled with accessories when shipped. Inspect the shipment carefully if you think that something is missing. This is rare, as we take considerable care to pack units for shipment, but it does sometimes happen. Please give us a call and we may be able to resolve this matter quickly over the phone.

NOTE

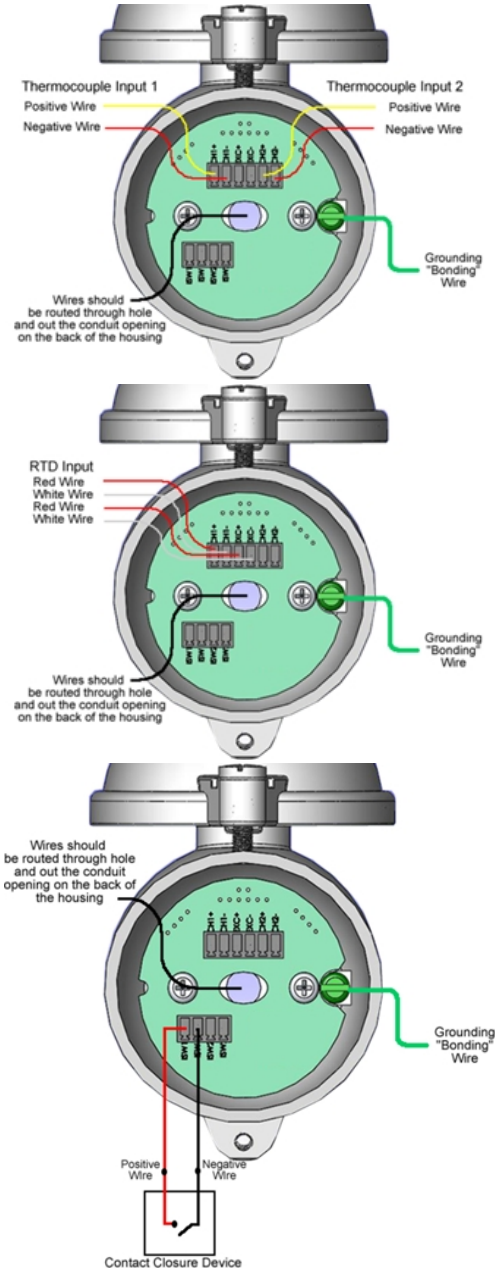
Please note that the carrier will not honor any claims for damage unless all shipping materials are saved for their examination. If damage is found during examining and removal of the contents, save the packing material and the carton.

1.4: SOFTWARE COMPATIBILITY

Software for Honeywell is revised periodically. Internal device software may contain portions that are not compatible with previous versions of the Wireless Management Toolkit software.

To ensure software compatibility, Wireless Management Toolkit software version 1.70.138 or later must be used. If you believe you are experiencing software compatibility issues please call Honeywell Technical Support at 800-423-9883 or email ACE@Honeywell.com.

Quick Start


Thermocouple Input 1
Positive Wire
Negative Wire
Thermocouple Input 2
Positive Wire
Negative Wire
Grounding "Bonding" Wire
Wires should be routed through hole and out the conduit opening on the back of the housing
RTD Input
Red Wire
White Wire
Red Wire
White Wire
Grounding "Bonding" Wire
Wires should be routed through hole and out the conduit opening on the back of the housing
Wires should be routed through hole and out the conduit opening on the back of the housing
Grounding "Bonding" Wire
Positive Wire
Negative Wire
Contact Closure Device

This section summarizes what must be done in order to get the device installed, configured, and in operation quickly. However, it does not provide detailed or how-to information to perform the tasks outlined. (Ignore steps 1 thru 5 and 16 if you do not have the split architecture Transmitter).

1. Install the Transmitter in the desired location of operation.
   Note: Trimming of the measurement may be necessary before the device can be placed in service. If trimming is required perform steps 1 and 6-16 prior to placing device in service.
2. Wire the channel input(s) as shown in top left figure.
3. Wire input switches as shown in middle left figure (optional).
4. Ground the Transmitter via grounding screw provided in enclosure.
5. Close enclosure and secure enclosure via set screw.
6. Turn on the Transmitter by simultaneously pressing and holding the ENTER and NEXT buttons the until unit powers up.
7. Set the RF CHAN setting equal to the Base Radio's RF Channel.
8. Set the BAUD RT setting equal to the Base Radio's Baud Rate.
9. Set the RF ID number to be a unique value between 1 and 50.
10. Select normal transmission rate.
11. Select normal sampling rate.
12. Select abnormal transmission rate.
13. Select abnormal sampling rate.
14. Set normal upper and lower values.
15. Select engineering measurement units.
16. Select the thermocouple/RTD sensor type.

If the "RF OFF" message is being displayed on the Transmitter LCD, perform the following:

- Set the RF CHAN setting equal to the Base Radio's RF Channel.

If a "NO RF" message is being displayed on the Transmitter LCD, check the following:

- Is the Transmitter set to the above listed settings?
- Is the Base Radio on?
- Do the Transmitter and Base Radio settings match? (See Section 5 of Transmitter and Base Radio User Guides)
- Are the Base Radio and Transmitters unable to communicate due to obstructions or distance? (See Section 3.1.1: Transmitter Positioning)

Warning

Warning! If the Transmitters have been running for an extended period of time with no signal from the Base Radio (the Base Radio is off or not present), the Transmitters will only search for the Base Radio every one hour or so. Turning the Transmitters off and back on will cause them to begin searching immediately.

Installation

3.1: Mechanical Installation

In this section, mechanical installation instructions are discussed for the various setup capabilities of the Temperature Transmitters.

Each Temperature Transmitter a rugged device, but it provides much better performance if installed with careful consideration, as noted in this manual. It may be utilized in any Temperature measurement service so long as care is exercised to prevent exposing the sensing elements to excess stress or temperature. Installation practices have a lot to do with these service parameters and the life that you can expect from your Temperature Transmitter s.

Warning

Warning! During installation do not apply force to the instrument housing or antenna. Use a proper wrench for all installations. Failure to use correct installation procedures can cause damage to the Transmitter.

Give careful consideration to the environment where you will be installing your instrument. Avoid installations that expose the device to excess temperature, high vibration, considerable shock, or exposure to dripping condensate or corrosive materials. Also avoid installing the device in an unserviceable location.

Most often these problems can be avoided with some thought at the time of installation. The practices noted below are generally recommended, but they can only act as a guideline and cannot cover all possible variations. The final installation must be made at the discretion and approval of the user. You must be the judge of the actual installation.

Dimensioned mechanical drawings for aid in mechanical installation are located in Section 9 Technical Specifications.

3.1.1: Transmitter Positioning

Correct positioning of the Transmitter will ensure the best performance of the device. When planning the positioning of the Transmitters, there are a few parameters that must be paid attention to:

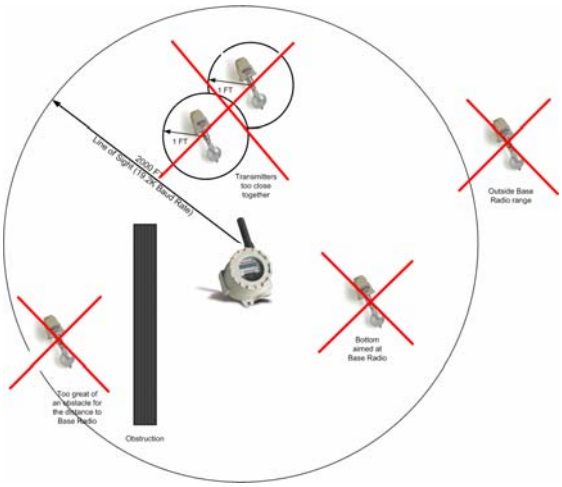

1 FT
1 FT
Transmitters too close together
Outside Base Radio range
Bottom aimed at Base Radio
Too great of an obstacle for the distance to Base Radio
Obstruction

Figure 3.1: Examples of Incorrect Transmitter Positioning

- The top of the Transmitter should point in an upward fashion. The bottom of the Transmitter should NOT point directly at the Base Radio and the Transmitter LCD should point away from the Base Radio.
- All Transmitters should maintain an approximate spacing of at least six feet apart from one another. Should you need to put Transmitters closer than six feet, please see Section 3.1.1.1 Technique for Close Positioning of Transmitters.
- The line of sight range between a Transmitter and Base Radio is 2000 feet at the 19.2K baud rate setting. Note that this range is reduced by the amount of RF Noise present, obstructions, and the material properties of the obstruction.
- Only place the Transmitter in ambient operating temperatures of -40°F to 185°F (-40°C to 85°C).

Figure 3.1 gives examples of incorrect setups according to the previously mentioned parameters.

Because there are so many setup possibilities we cannot cover them all. A correct setup would make sure that the above warnings are heeded, and that the Transmitter and Base Radio are capable of communication. The Testing Communications section will help you to determine if you have selected the correct installation points and orientations for your application.

3.1.1.1: Technique for Close Positioning of Transmitters

Group	RF ID Range
1	1-7
2	8-14
3	15-21
4	22-28
5	29-35
6	36-42
7	43-49
8	50-56
9	57-63
10	64-70
11	71-77
12	78-84
13	85-91
14	92-98
15	99-100

Transmitters may be placed closely together by carefully following this procedure. If this procedure is not followed, the communication range of the Transmitters will be significantly reduced and the Transmitters may eventually lose communication with the Base Radio entirely. This procedure is easy to implement, but please read carefully for a full understanding.

The Base Radio synchronizes with the Transmitters in Synch Groups of 7, organized by their RF ID numbers. If you want to place two Transmitters closer than 6 feet, make sure that you have set them in different groups. Note that this only applies to Transmitters that are communicating with the same Base Radio. The groups are defined in the table to the left.

For example, if two Transmitters are placed one foot apart and the first Transmitter has an RF ID number of 027, that means it is in the 4th group (22-28). The second Transmitter must have an RF ID number that is in another group (less than 22 or greater than 28). Setting the RF IDs of two closely spaced Transmitters so that the RF ID numbers are greater than 7 apart ensures that the Transmitters are in different Base Radio sync groups. This allows the closely spaced Transmitters to properly receive their synchronization signal from the Base Radio and maintain their proper communication and range.

You can also ensure that closely spaced Transmitters maintain their synchronization with their Base Radio by simply assigning each of the two closely spaced Transmitters to talk to a different Base Radio.

Either way, following this process will keep the Base Radio and Transmitters properly synchronized for long-term communication.

3.1.2: Testing Communications

Remember, proper placement of the Transmitter will optimize your RF communication range and capabilities. Perhaps the best test to perform before mechanically mounting the unit is a quick hand-held test. There are two types of tests you can conduct: the RSSI (Received Signal Strength Indicator) Diagnostic and the Link Test. The RSSI Diagnostic measures the strength of the signal at the Transmitter. The Link Test measures the throughput of data sent to and from the Transmitter. The Link Test may be conducted from the Transmitter, Base Radio, or through WMT.

The RSSI Diagnostic should be conducted first to determine if the Base Radio is communicating with the Transmitter. Then the Link Test may be performed to test the validity of the installation.

To perform these tests you should have a good idea of where the Base Radio will be placed (for more information see Section 3 of the Base Radio User Manual). Put the Base Radio in this area and power it up. Make sure that the Base Radio and Transmitter are on the same RF Channel and Baud Rate (See Section 5). You may also have to increment the number of Transmitters with which the Base Radio is communicating (See the Base Radio User Manual Section 4.3).

Once both the Base Radio and Transmitter are set up to be on the same network, make sure communication is established by looking at the Transmitter LCD for the ‘RF OK’ message in the Read-Only Sequence (see Section 4.2.1).

After communications have been established, go to Section 3.1.2.1 for the RSSI Diagnostic or Section 3.1.3 for the Link Test.

3.1.2.1: Transmitter RSSI Diagnostic

The Transmitter should be placed in RSSI Diagnostic mode to determine the signal strength at the location of the equipment to be monitored.

The RSSI Diagnostic, located in the Transmitter's diagnostic menu, displays the RF signal strength in one of seven ranges. The signal strength is displayed on the LCD using a combination of '>' and '_' characters. Full signal strength is displayed as "> > > > > > >" while minimum signal strength is displayed as "> _ _ _ _ _ _". If the Transmitter is not communicating with the Base Radio (i.e. NO RF), all underscore characters will be displayed ("_ _ _ _ _ _ _").

The RSSI is measured every time the Transmitter receives a message from the Base Radio. The signal strength of the received message from the Base Radio is calculated during this time. The actual signal strength in dBm for each range is shown below:

>	>	>	>	>	>	>
Less than	Between	Between	Between	Between	Between	Greater than
-105 dBm	-105 dBm & -100 dBm	-100 dBm & -95 dBm	-95 dBm & -90 dBm	-90 dBm & -85 dBm	-85 dBm & -80 dBm	-80 dBm

To place the Transmitter in RSSI Diagnostic mode follow the menu map shown in Figure 3.2. Note that the RSSI menu is under the DIAGNSE menu and not the CONFIG menu.

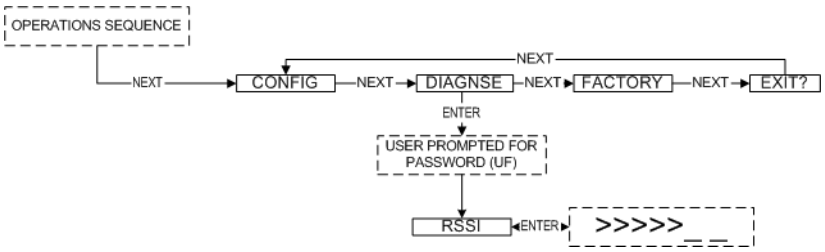


Figure 3.2: Menu Map to RSSI Mode

Now that the Transmitter is in the RSSI mode, bring the Transmitter close to the equipment you wish to monitor. Look at the LCD; notice the '>' will constantly fluctuate. One should estimate an average value based on these fluctuations. The ideal signal integrity is seven arrows.

Once you have verified that you are receiving a signal, you should check to make sure the Transmitter is communicating properly with the Base Radio. To do so, exit the RSSI by pressing ENTER, and then navigate to EXIT? of the diagnostic menu and return to the Operations Sequence shown in Figure 4.1 in Section 4.2.

If you see a NO RF message, then you do not have satisfactory RF communication with the Base Radio. If your application allows, move the Transmitter to a different position and check again for communications. If your application only allows you to mount at this particular point, you may want to try a slower baud rate setting for an increased range.

One final solution is to reposition the Base Radio. However, this may affect communications with previously installed Transmitters, and if so, may require the use of a second Base Radio for your application. To select a better spot for the Base Radio, see Section 3.1.1 of the Base Radio User Manual.

NOTE

While using a slower baud rate increases communication distance, it also increases the transmit rate. See Section 5.2 for a list of the fastest transmit rates for each baud rate. This may not be suitable for your application.

3.1.3: Link Test

The Link Test measures the wireless link performance of a Transmitter running in its normal operating mode. Messages are sent from the Transmitter to the Base Radio at a predefined interval called the Transmit Rate (see Section 6.1). Each message contains data for the previous time period (since the last transmit). The Link Test looks at the wireless performance going in both directions, from the Transmitter to the Base Radio and vice versa, and comes up with a rating. The result that appears on the display shows the determined link strength.

In order to perform this test, the Transmitter must be communicating on the same channel and baud rate as the Base Radio. See Section 5 to configure communications.

The Link Test may be conducted from the Transmitter, Base Radio, or through WMT. Running the Link Test from WMT is ideal for testing communications for an installation with remote or hard-to-get-to Transmitters. To conduct the Link Test from a Base Radio, see Section 3.1.3.2. To conduct the Link Test from WMT, see Section 3.1.3.3.

3.1.3.1 Conducting a Link Test from the Transmitter

The Link Test is located in the Transmitter's diagnostic menu (see Figure 3.3).

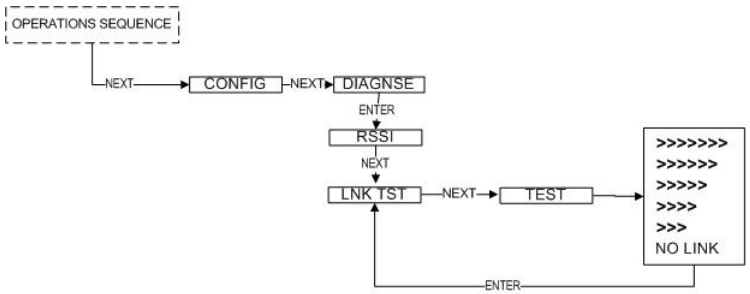


Figure 3.3: Transmitter Link Test

Using the NEXT and ENTER buttons, navigate to Link Test, and press the ENTER button to begin the test. The Transmitter will begin to test the link in both directions (to and from the Base Radio). During this time, the word TEST will appear on the LCD display. When the test is complete, the Transmitter will display the quality of the link. Be aware that the Transmitter uses the configured Baud Rate and transmission rate to perform this test. The length of time it will take to perform this test is dependent upon how fast the device is normally transmitting.

When enough messages have been observed, a link strength will be shown on the display. >>>>> indicates the strongest link, while > indicates the weakest link. The Link Test will continue to be evaluated and the rating on the screen may adjust itself. Keep in mind that the longer the Link Test runs the more data the Transmitter will have to evaluate.

The Transmitter installation site should strive to place the Transmitter in a location where it receives the highest number possible. A stronger link means less data re-transmits and better battery life.

3.1.3.2 Conducting a Link Test from the Base Radio

When the Link Test is conducted from a Base Radio, it measures the link strength between a selected Transmitter and the Base Radio. The Link Test data must be configured to match the communication parameters of the Transmitter from which you want to test. The Link Test is located in the Base Radio's diagnostic menu (see Figure 3.4).

To conduct a Link Test from the Base Radio, Navigate to Link Test, and press the ENTER button.

3.1.3.2 Continued

Next enter the RF ID for the Transmitter that you want to test. Then select the Normal Transmit rate that matches that of the Transmitter. If the Transmitter is transmitting at a different rate than the one you select in this menu, your results will be invalid.

Once the Normal Transmit Rate is selected, the Link Test will immediately start. The Base Radio will begin to test the link from the Transmitter. During this time, the word TEST will appear on the LCD display. When the test is complete, the Base Radio will display the quality of the link. Be aware that the length of time it takes to perform this test is dependent upon how fast the Transmitter is normally transmitting.

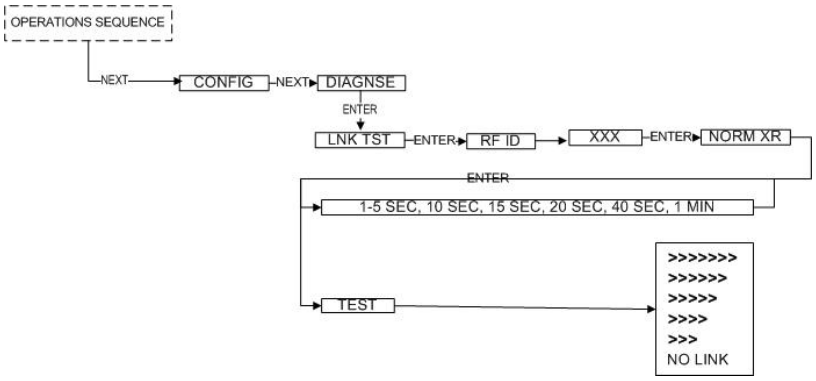


Figure 3.4: Base Radio Link Test

When enough messages have been observed, a link strength will be shown on the display. >>>>> indicates the strongest link, while > indicates the weakest link. The Link Test will continue to be evaluated and the rating on the screen may adjust itself. Keep in mind that the longer the Link Test runs the more data the Transmitter will have to evaluate.

The Transmitter installation site should strive to place the Transmitter in a location where it receives the highest number possible. A stronger link means less data re-transmits and better battery life.

3.1.3.3 Conducting a Link Test from WMT

To conduct a Link Test from WMT, make sure that WMT is running on the PC attached to the Base Radio. Then go to the Transmitter view, and right-click on the Transmitter you want to test Received data transmission from

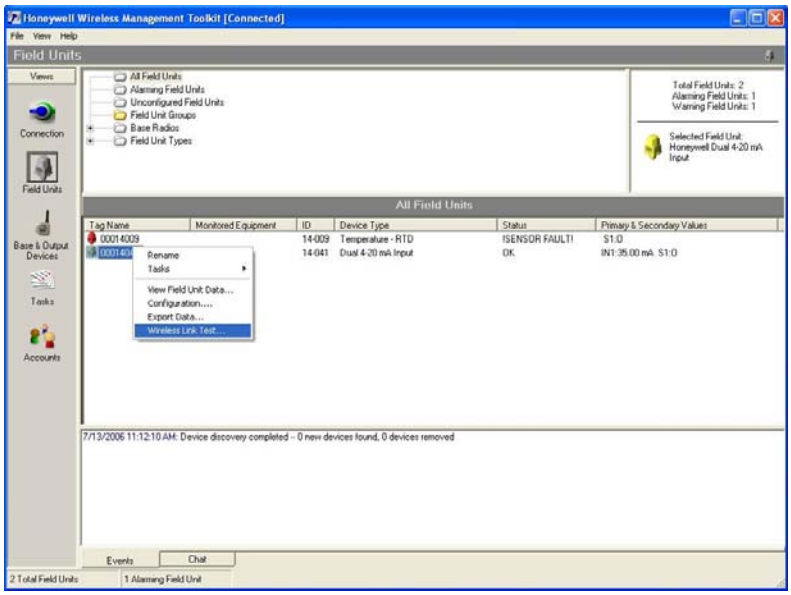


Figure 3.5: WMT Transmitter View

3.1.3.3 Continued

Select **Wireless Data Loss Test…** from the popup menu.

The Wireless Data Loss Test window appears (Figure 3.6). The name of the Transmitter being tested appears in the title bar in parenthesis.

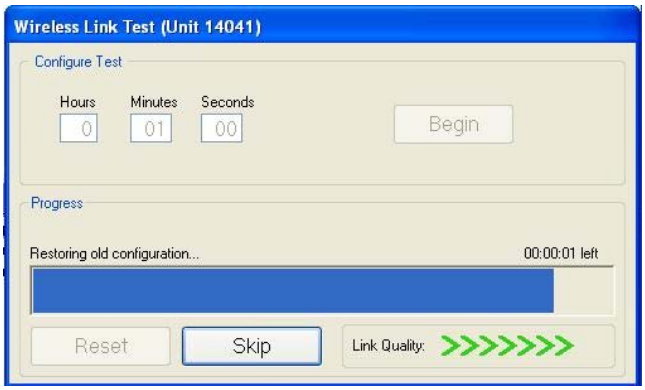


Figure 3.6: Wireless Data Loss Test

In the top of the window, you can configure the test to run for a specified amount of time. The longer the test, the more data the test will have to do an evaluation. Type the length of time that you want to run the test and click BEGIN to start. Once the test starts, WMT will reconfigure the Transmitter's Transmit Rate to the fastest possible for the selected Baud Rate. These rates are listed in Section 5.2. After the test has completed, it will restore the previously configured Transmit Rate.

During the test, the communications reliability is evaluated while the Transmitter is running under normal operating conditions. As the test runs, a link strength will be shown in the lower right hand corner of the window. >>>>> indicates the strongest link, while > indicates the weakest link. The Link Test will continue to be evaluated and the rating on the screen may adjust itself for the specified amount of time.

3.2: Electrical Installation

Caution

Remember to turn off all power **BEFORE** hooking up any wires!

In this section wiring instructions are discussed for the various setup capabilities of the Temperature Transmitter. This section only applies if you have ordered the WT531T or WT531R. If the integrated architecture version of the Temperature Transmitter has been purchased, then skip the electrical installation section. The subsections are as follows:

3.2.1: Electrical Specifications
3.2.2: Wiring the Thermocouple/RTD Input
3.2.3: Wiring the Input Switches

3.2.1: Electrical Specifications

Warning

Explosions may result in death or serious injury. Do not remove the instrument cover or open wiring housing in explosive atmospheres when power and communications are on.

Input Switch Characteristics

- For simple device monitoring only (i.e., contact closures)
- Input switches share common ground

3.2.2: Wiring the Thermocouple/ RTD Input

NOTE

For Dual T/C installations, the inputs share a common ground (-). Use Ungrounded T/C's or ensure that both T/C's are at the same ground potential to avoid ground loop effects.

To properly wire a thermocouple/RTD to the Temperature Transmitter follow the wiring diagram provided below. Please note that a thermocouple **CANNOT** be wired to a WT531R unit, and a RTD **CANNOT** be wired to a WT531T unit.

The diagram shown in Figure 3.7 below refers to the circuit board found at the base of the Transmitter, within the junction box. Before connecting wires to the terminal blocks, the input wires should be routed into the back of the enclosure and threaded through the center of the circuit board.

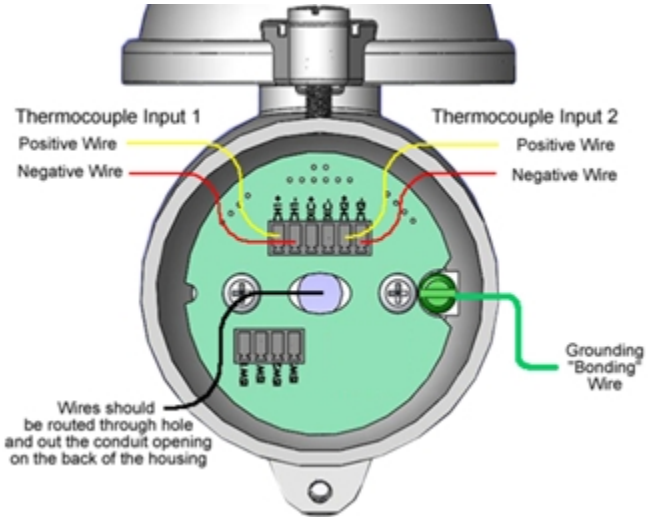

Thermocouple Input 1
Positive Wire
Negative Wire
Thermocouple Input 2
Positive Wire
Negative Wire
Grounding "Bonding" Wire
Wires should be routed through hole and out the conduit opening on the back of the housing

Figure 3.7: Thermocouple Input Wiring Diagrams

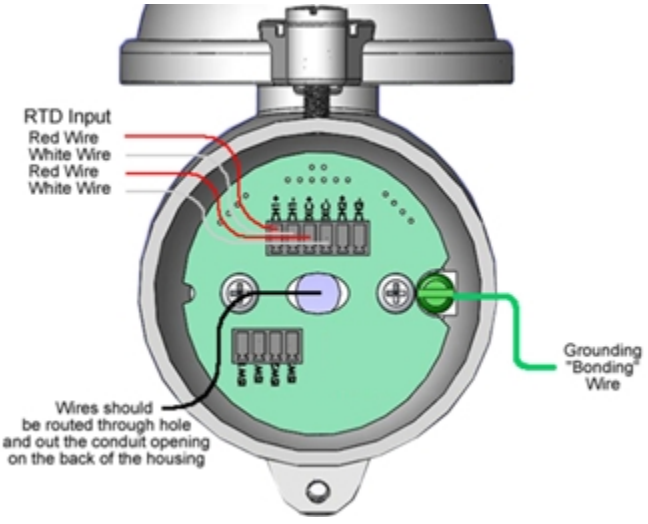

RTD Input
Red Wire
White Wire
Red Wire
White Wire
Grounding "Bonding" Wire
Wires should be routed through hole and out the conduit opening on the back of the housing

Figure 3.8: RTD Input Wiring Diagrams

NOTE

If using two thermocouples remember to enable both thermocouple inputs otherwise the measurement of the disabled thermocouple will not be made.

3.2.3: Wiring the Input Switches (Optional)

To properly wire a switch input device to the Temperature Transmitter simply follow the wiring diagram provided below. Please note that loop power does NOT need to be supplied as the Transmitter supplies the monitoring power. The Temperature Transmitter has the capability of monitoring two input switches.

NOTE

The RTD Temperature Transmitter (WT531R) has only **ONE INPUT SWITCH**.

The most common application for the switch inputs is to monitor a contact closure. However, the input switches must only be attached to simple devices. A simple device is one that meets the conditions set forth in the Intrinsic Safety Control Drawing, which can be found in the Technical Specifications section of this manual.

Warning

Wiring the Temperature Transmitter to a non-simple device (such as an explosion proof device) **voids the intrinsic safety** of the Transmitter. A simple device is one that meets the conditions set forth in the Intrinsic Safety Control Drawing found in the Technical Specifications section of this manual.

The diagram shown below in Figure 3.9, refers to the circuit board found at the base of the Transmitter, within the junction box. Before connecting wires to the terminal blocks, the input wires should be routed into the back of the enclosure and threaded through the center of the circuit board.

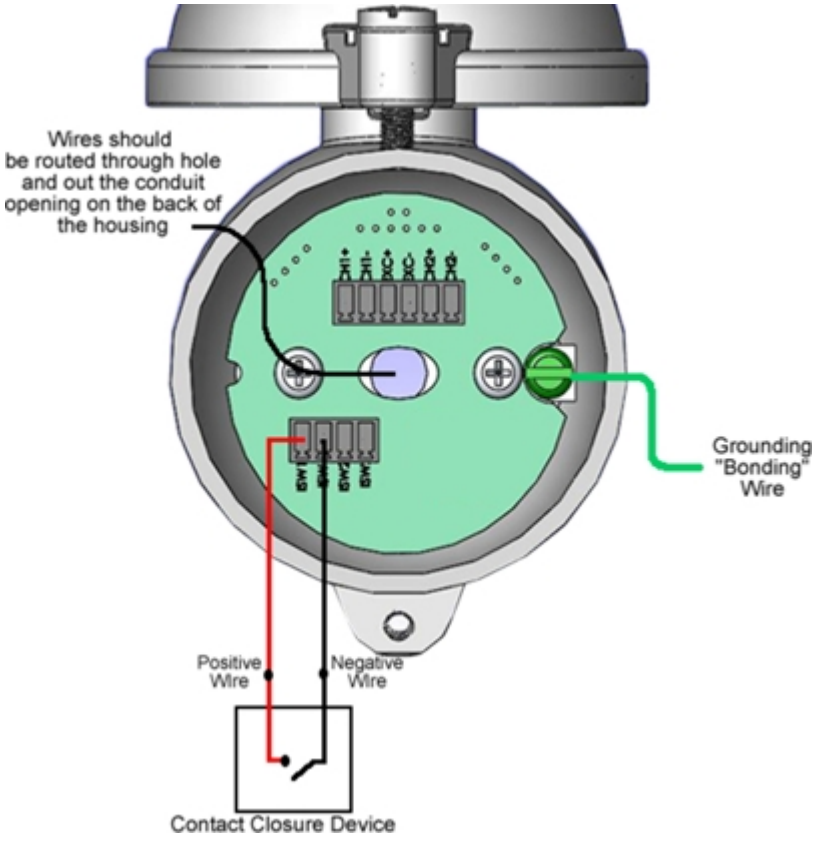

Wires should be routed through hole and out the conduit opening on the back of the housing
Grounding "Bonding" Wire
Positive Wire
Negative Wire
Contact Closure Device

Figure 3.9: Input Switch Wiring Diagram

Note that the Transmitter may continue to monitor the temperature inputs in addition to the contact closure monitoring. Also, the contact closure monitoring requires NO POWER to be supplied to the loop, nor does the user have to enable or enter any information via the NEXT and ENTER buttons, as this is done automatically by the Transmitter.

No messages indicating the status of a monitored contact closure are displayed on the Transmitter LCD. The status of the input switches can be found in the Wireless Management Toolkit under the Transmitter View. An open contact closure is indicated as an 'O' and a closed contact closure is indicated as a 'C' on the Transmitter View (see Wireless Management Toolkit Manual section 8.1) for each input switch.

General Configuration

This section discusses the generalities for configuring the Transmitter via the NEXT and ENTER buttons. The subsections are as follows:

4.1 Navigating User Menus
4.2: Transmitter Displayed Messages
4.2.1: The Read-Only Sequence
4.3: The Overall Configuration Menu Map
4.4: Setting the Transmitter Tag Name
4.5: Setting a User Password
4.6: Resetting All Transmitter Settings

4.1: Navigating User Menus

Pressing either the NEXT or ENTER buttons located on the front of the Transmitter or Base Radio just below the LCD screen is all that is needed to navigate the respective menus. Pressing both of these buttons for one second will turn the unit on.

NOTE

If the unit is turned off while entering values in a sub menu, those values will NOT be saved.

Pressing the NEXT button at any time while the Transmitter is cycling through the normal messages causes the Transmitter to enter the setup mode. The NEXT button is then used to step through menu options, and the ENTER button is used to enter a sub menu of what is displayed on the LCD at that time. If no button is pressed within a 30-second period, the unit goes back to the normal display mode.

NOTE

There are several menu options that will automatically turn off if you are using WMT. All changes to these Transmitter menu options should then be made through WMT instead. This is to prevent simultaneous changes from taking place. If you wish to discontinue use of the software and want these menus re-instated, you must contact your Honeywell Sales Representative.

If you enter a sub menu that requires a numerical input, such as 001, the leftmost 0 will be blinking. This indicates that pressing the NEXT button will increment this value with each press from 0 to 9 and back to 0 again. Pressing the ENTER button will move to the next available value. If the last value is blinking, pressing ENTER will save the entered values and return from the sub menu.

If both the NEXT and ENTER buttons are depressed at the same time, a message on the LCD displaying OFF? will appear. If both buttons are released upon appearance of this message the user will be returned to the scrolling main screen. If both buttons are not released for the duration of the OFF? message, you will be prompted for the password. Upon entering the correct password, the unit will power down and turn off.

4.2: Transmitter Displayed Messages

To turn the Transmitter on, press and hold both the NEXT and ENTER buttons for a few seconds. Upon power up, the Transmitter will display the Power-Up Sequence, and then go into the Operations Sequence. These sequences are shown in Figure 4.1.

4.2: Continued

NOTE

During configuration and testing, keep Transmitters at least six feet from the Base Radio and other Transmitters.

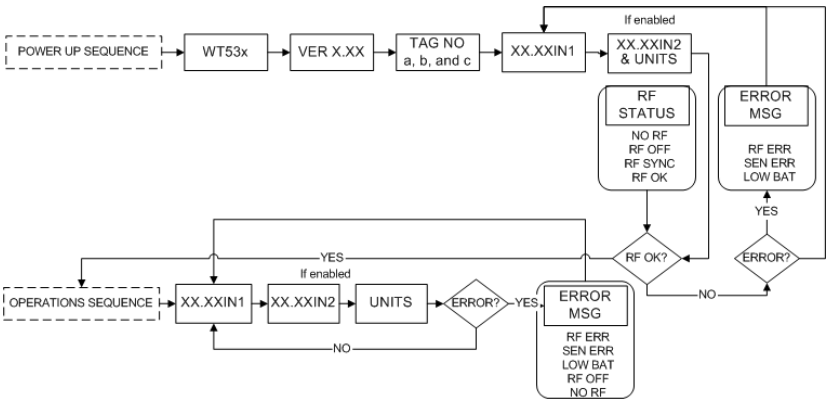


Figure 4.1: Transmitter Power-Up and Operations LCD Sequences

4.2.1: The Read-Only Sequence

Once the Transmitter is in the Operations Sequence, a user may access the Read-Only Sequence without a password by simply pressing the ENTER button at any time. The Read-Only Sequence, as shown in Figure 4.2, displays extra information about the current settings of the Transmitter that is not seen during the Operations Sequence, but does not allow any changes to be made to these settings.

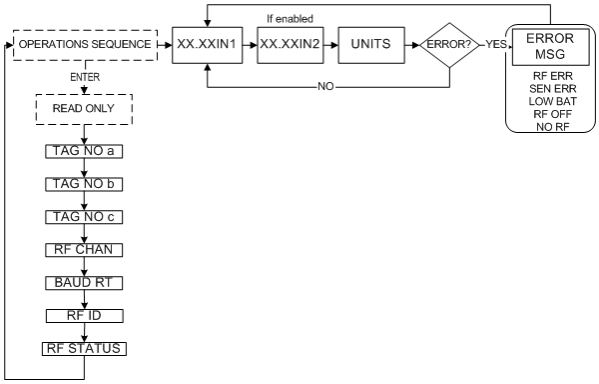


Figure 4.2: The Read-Only Sequence

4.3: Overall Configuration Menu Map

A complete Transmitter Menu Map is shown in Appendix C. Below is an overall view of the configuration menu to aid the user in setting up the Transmitter for proper operation.

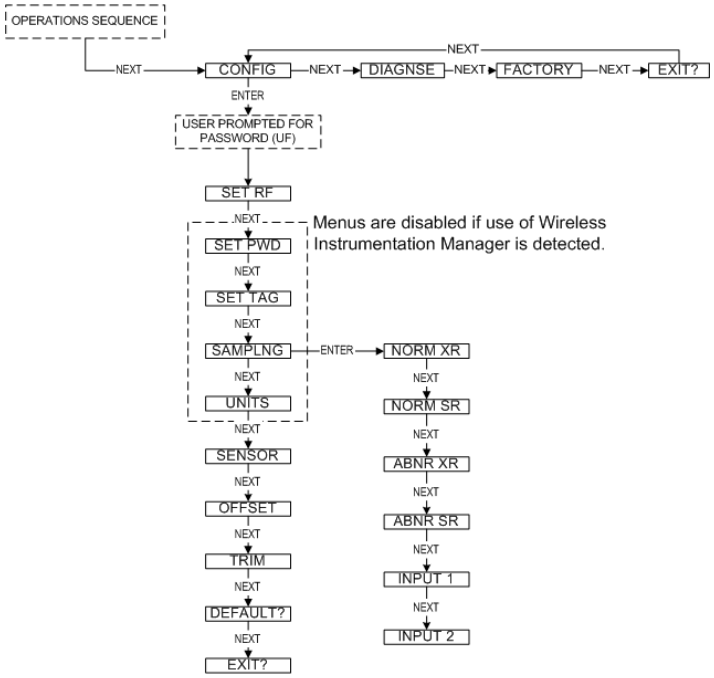


Figure 4.3: Overall Configuration Menu Map

NOTE

The user must enter a four digit password to enter the CONFIG and DIAGNSE. The FACTORY menu is for factory use only. The default user password is 0000. For more information on the password see Section 4.5.

NOTE

Once WMT has been used to configure the Transmitter, this menu option will be disabled on the Transmitter LCD menu. See Section 4.1 for more details.

4.4: Setting the Transmitter Tag Name*

Each Transmitter has a user-settable Transmitter Tag Name. This Tag Name is displayed upon Transmitter power up, and when the Read-Only Sequence is selected. The Tag Name is a 21-character string that is displayed in three separate 7-character flashes on the Transmitter LCD.

The user may choose from A-Z, 0-9, a dash ("-"), and an underscore ("_"). The underscore has a special meaning to the software inside the Transmitter. For example, if you have a Tag Name that is only 5 characters long, then you do not want to wait for the rest of the 16 characters to be displayed on the LCD. So if your Tag Name was "TANK1", you would want to enter the Tag Name like this: "TANK1_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _".

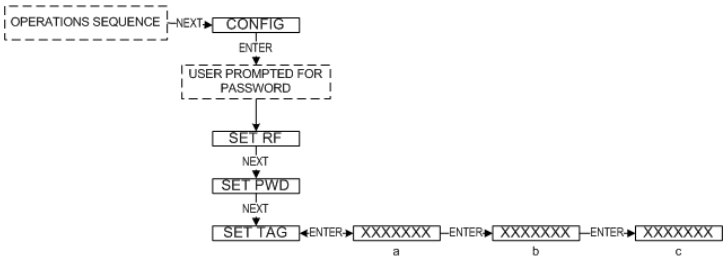


Figure 4.4: Menu Map to Tag Name Setting

Using Wireless Management Toolkit

The Tag Name can also be entered via WMT. To do so, when the software is in the Transmitter view (See Appendix A), right-click the Transmitter icon, select Rename, and then enter the Tag Name you wish the Transmitter to have.

This Tag Name will then be uploaded to the Transmitter and can be displayed by pressing the ENTER button when the unit is in the Operations Sequence (See Section 4.2.1 of this manual).

** Indicates that Menu is Disabled if Wireless Management Toolkit is detected. (See Appendix A)*

4.5: Setting a User Password*

NOTE

Once WMT has been used to configure the Transmitter, this menu option will be disabled on the Transmitter LCD menu. See Section 4.1 for more details.

Each Transmitter has a password that will lock out undesired users from making changes to the Transmitter. Any user may still view some of the Transmitter settings by pressing the ENTER key during the Operations Sequence and viewing the Read-Only Sequence.

The password is a four-digit password. The factory default is 0000. If you wish to select a different password, one may be entered via WMT. To do so, enter the configuration dialog box (See Appendix A). From the configuration dialog box, click on the **General** tab to bring up the general information as shown in Figure 4.6.

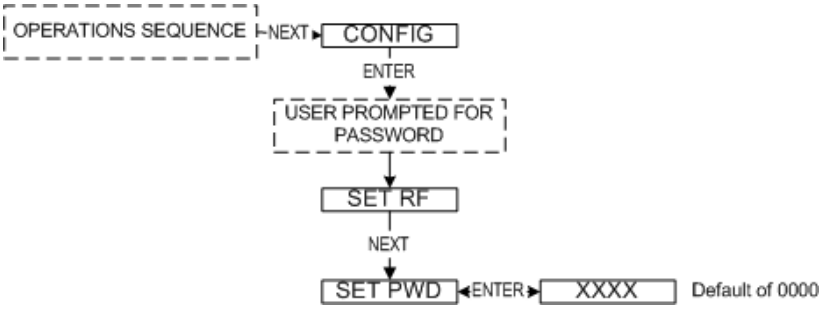


Figure 4.5: Menu Map to Password Setting

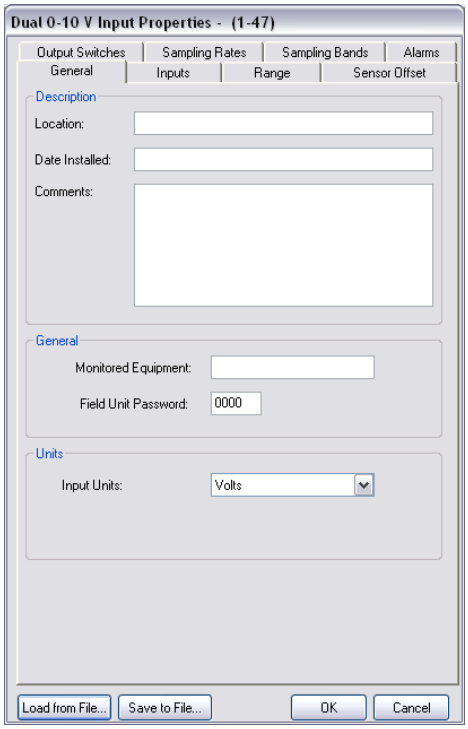


Figure 4.6: Password Setting Using Wireless Management Toolkit

If you have the Wireless Management Toolkit software this menu option will not be accessible via the Transmitter once the Transmitter detects that the software is being used (See Appendix A for more details). The password should be entered using the Wireless Management Toolkit software. To do so, enter the configuration menu (See Section 9.2 of the Wireless Management Toolkit User Manual). Once in the configuration menu click on the **General** tab to bring up the general information as shown in Figure 4.6.

The Transmitter password for this device can be set by entering a four-digit number in the **Transmitter Password** field. Once a password has been entered, click **OK** to save and download the password to the Transmitter.

Please note that the password only protects the Transmitter from unauthorized configuration via the NEXT and ENTER buttons. The Wireless Management Toolkit requires a user login password to gain access to all configuration parameters. However, user accounts are available and can be set with different access levels and restrictions (For more information on user accounts see the Wireless Management Toolkit User Manual Section 8.4).

4.6: Resetting All Transmitter Settings

NOTE

Resetting the Transmitter by using the DEFAULT menu option will not reset the TRIM or OFFSET values .

To reset all Transmitter settings to their default state, you must navigate to the DEFAULT menu option in the CONFIG menu via the keypad.

Once at the default menu option, pressing the ENTER button will display 'RESET?' on the LCD; which asks if you are sure you want to reset the device to its default configuration. You will then be prompted with 'NO' on the LCD. Pressing the ENTER button while 'NO' is being displayed will NOT reset the device. Pressing the NEXT button will display 'YES' on the LCD. If you press the ENTER button while 'YES' is being displayed the device will be reset.

** Indicates that Menu is Disabled if Wireless Management Toolkit is detected. (See Appendix A)*

4.6: Continued

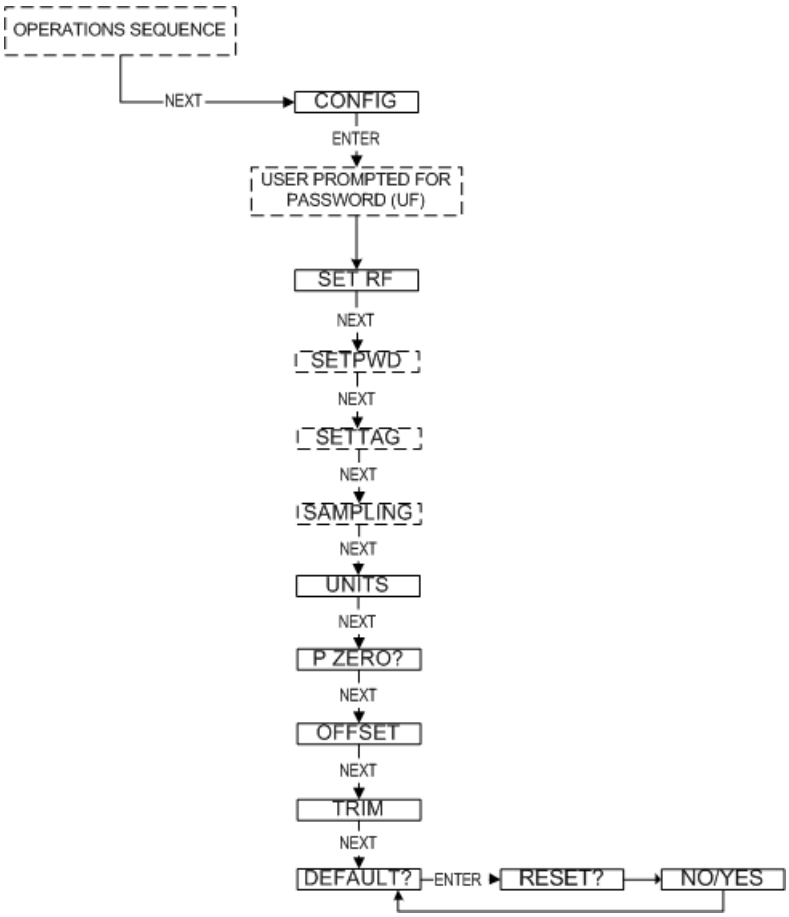


Figure 4.7: Menu Map to Reset All Transmitter Settings

Configuring the RF Communications

Warning

Warning! If the Transmitters have been running for an extended period of time with no signal from the Base Radio (the Base Radio is off or not present), the Transmitters will only search for the Base Radio every one hour or so. Turning the Transmitters off and back on will cause them to begin searching immediately.

In order for the Transmitter and the Base Radio to communicate, they must be on the same RF Channel and must be transmitting at the same Baud Rate. While all Transmitters and Base Radios are set to default configurations at the factory, if any configuration differences are present the Base Radio will not be able to communicate with the Transmitters. The subsections are as follows:

5.1: RF Channel Setup
5.2: RF Baud Rate Setup
5.3: RF Identification Setup

5.1: RF Channel Selection

NOTE

The RF Channel defines a set of frequencies on which communication takes place between the Base Radio and the Transmitter. Each RF Channel has a different set of frequencies, thus allowing the user to have multiple different wireless networks co-existing throughout the same facility.

The RF Channel defines a set of frequencies on which communication takes place between the Base Radio and the Transmitter. Each RF Channel has a different set of frequencies, thus allowing the user to have multiple different wireless networks co-existing throughout the same facility.

All Base Radios and Transmitters can be set to one of 16 different RF channels. The only Transmitters recognized by a particular Base Radio are the units that are on the same RF Channel as that Base Radio. This allows the user to decide which Transmitters communicate with each Base Radio.

The RF Channel can be thought of as a set of walkie-talkies. If both walkie-talkies are on channel one they can communicate. If a walkie-talkie is on channel one and the other is on channel two, they cannot communicate. Likewise, if two walkie-talkies are on channel one and two other walkie-talkies are on channel two, the walkie-talkies on channel one cannot hear what is being transmitted by the walkie-talkies on channel two.

Each Transmitter comes from the factory with the RF Channel set to OFF. This means the Transmitter will not communicate to any Base Radio. To set the Transmitter for communication, first determine the channel that you want to use. Then follow the Transmitter menu map shown in Figure 5.1 to configure the RF Channel.

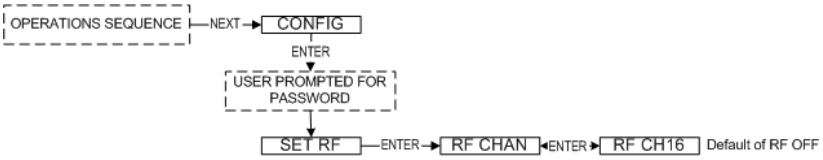


Figure 5.1: Menu Map to RF Channel Setting

Once in the RF Channel menu, increment it by pressing the NEXT button. When selecting this value, do not choose an RF Channel that is currently being used by other Honeywell Wireless Systems as this can cause communication problems.

5.2: RF Baud Rate Selection

NOTE

If you change the baud rate of a Transmitter, you must also change the baud rate of the Base Radio and all other Transmitters that are communicating with that Base Radio to match.

The RF Baud Rate refers to the speed at which the Base Radio and Transmitters communicate. The RF baud rate for the Base Radio and the Transmitter must be the same in order for successful communication to occur. There are three selectable settings with the fastest update times and ranges listed below:

- 4.8K –Rate of 4.8 Kbaud (Update every 20 seconds)
  –Range of 3000ft (Line of Sight)
- 19.2K– Rate of 19.2 Kbaud (Update every 5 seconds)
  –Range of 2000ft to 2500ft (Line of Sight)
- 76.8K– Rate of 76.8 Kbaud (Update every 1 second)
  –Range of 500ft to 750ft (Line of Sight)

5.2: Continued

A faster RF Baud Rate allows the user to transmit more information in a given period of time, but it will also limit the Transmitter's range. If you need more distance out of your Transmitters or are encountering difficulties by frequently losing communications, then select a slower baud rate.

Follow the Base Radio menu map shown in Figure 5.2 to configure the RF Baud Rate. The factory default is the 19.2K Baud Rate.

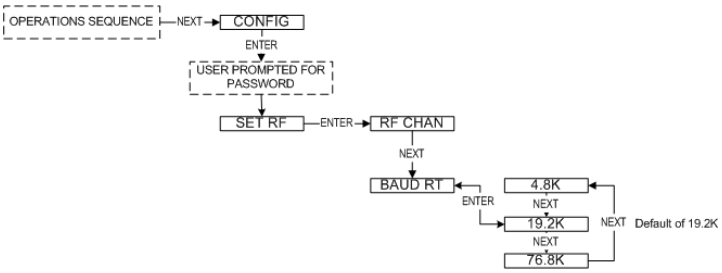


Figure 5.2: Menu Map to RF Baud Rate Setting

5.3: RF Identification (RF ID) Selection

Each Transmitter is identified by the Base Radio and WMT, according to the RF ID given to that particular unit. Two Transmitters on the same RF Channel CANNOT have the same RF ID (if you do not know the RF Channel, see section 5.1). When the Transmitter is in the Operations Sequence, pressing the ENTER button displays the Read-Only Sequence on the LCD. The RF of that unit will be displayed in the format: ID 3.

All Transmitters in your system are set to a default RF ID number upon shipment. For example, if you have ordered a Base Radio and three Transmitters, the Transmitters will be configured to ID's 0, 0 and 0. You must set these units to three different RF IDs between 1 and 100. The Transmitters in this example could be set to RF IDs 1, 2, and 3.

First determine the RF ID's you'd like to give each unit. Then follow the menu map shown in Figure 5.3 to configure the RF ID. The factory default is RF ID 0, which disables the RF communication of the unit.

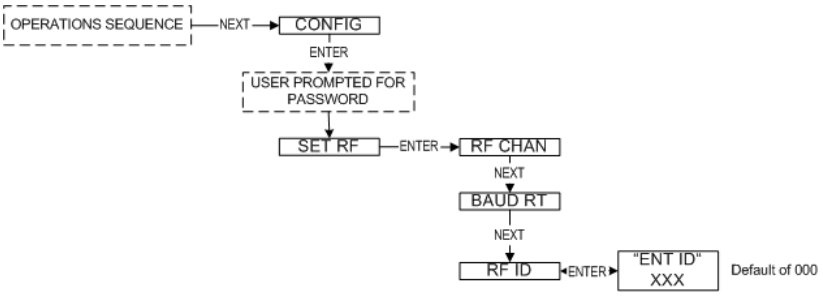


Figure 5.3: Menu Map to RF ID Setting

Once you have selected the RF ID you wish to use for this particular Transmitter, exit the menus and return to the Operations Sequence.

The Transmitter should now be successfully configured to the Base Radio. To check this, press ENTER while the Transmitter is in the Operations Sequence for the Read-Only Sequence to be displayed. You may see an RF SYNC message displayed on the Transmitter LCD. This means that the Transmitter and Base Radio are attempting to synchronize communications. If this is successful, the RF Status will display an RF OK message. If this is unsuccessful, the RF Status will display a NO RF message.

Also notice the two small arrows on either side of the LCD; if they are fluctuating up and down, that indicates the Transmitter and Base Radio are successfully communicating. If only one or none of the arrows are moving then they are not communicating successfully.

Configuring the Sampling and Transmission Rates

The Temperature Transmitter is very versatile with many programmable features and can be used in numerous different applications. Because no two applications are the same, some configuration is required for each unit. This section will walk you through the initial configuration of these sample and transmit settings. The subsections are as follows:

6.1: Selecting the Normal Transmission Rate
6.2: Selecting the Normal Sampling Rate
6.3: Selecting the Abnormal Transmission Rate
6.4: Selecting the Abnormal Sampling Rate
6.5: Setting the Smart Rate Threshold
6.6: Selecting the Normal Upper and Lower Values
6.7: Selecting Rates, Thresholds, and Deadbands via the Software

6.1: Selecting the Normal Transmission Rate*

The **Normal Transmission Rate** is the interval in which the Transmitter transmits data to the Base Radio. The Transmitter is in a "sleep" mode to save power during the operations sequence. This mode turns off most of the electronics on the unit, with the exception of the LCD, in order to preserve battery life. The Transmitter will then 'wake up' every Normal Sampling Period and take the necessary process value readings. The Transmitter will then transmit these readings to the Base Radio on an interval determined by the Normal Transmission Rate.

Notice that the fastest update rate of the Normal Transmission Rate is dependent on the baud rate setting you selected earlier (see Section 5.2). The transmission rates cannot update data faster than their communication speed allows. Thus, if you selected the 19.2K Baud Rate setting, your fastest transmission rate will be 5 seconds. The Transmitter automatically determines these settings and adjusts the menu options accordingly. A complete table of these parameters is shown in Section 6.2.

In order to properly set the Normal Transmission Rate, you must first determine how often you need updates from the Transmitter. You have a selectable range of 1-5, 10, 15, 20, 40 seconds and 1 minute. The factory default is 10 seconds.

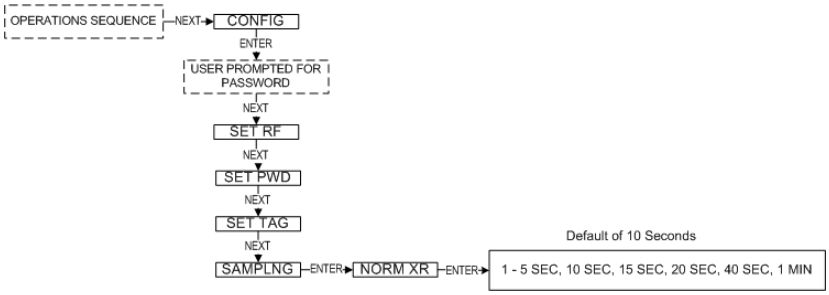


Figure 6.1: Menu Map to Normal Transmission Rate Setting

Using Wireless Management Toolkit

If all of the data does not get through, the data is resent the following second. This prevents data from being lost. However, if the Transmission Rate is set to the maximum (1 second; 76.8K baud), then the data cannot be resent the following second because the next set of data must be sent in order to meet the Transmission Rate.

** Indicates that Menu is Disabled if Wireless Management Toolkit is detected. (See Appendix A)*

6.2: Selecting the Normal Sampling Rate*

The **Normal Sampling Rate** is the interval in which the Transmitter reads the monitored process value. As previously mentioned, the Transmitter is in "sleep" mode to save power during the operations sequence. This mode turns off most of the electronics on the unit (with the exception of the LCD) in order to preserve battery life. The Transmitter will then 'wake up' for every Normal Sampling Period and take the necessary process value readings.

Notice that the minimum speed of the Normal Sampling Rate is dependent on the Normal Transmission Rate setting selected earlier (see section 6.1). The Sampling Rate cannot be slower than Normal Sampling Rate. Thus, if you set the Normal Transmit Rate setting to be 10 seconds, the Normal Sampling Rate must be set to 10 seconds or faster. A complete table of

Baud Rate (communication range) (fastest speed of updates)	76.8K	19.2K	4.8K
	500-750 feet	2000-2500 feet	3000 feet
	1 Second	5 Seconds	20 Seconds
Normal and Abnormal Transmit Rates	1 Second or Greater	5 Seconds or Greater	20 Seconds or Greater
Normal and Abnormal Sampling Rates	Equal to Transmit Rate or Less	Equal to Transmit Rate or Less	Equal to Transmit Rate or Less

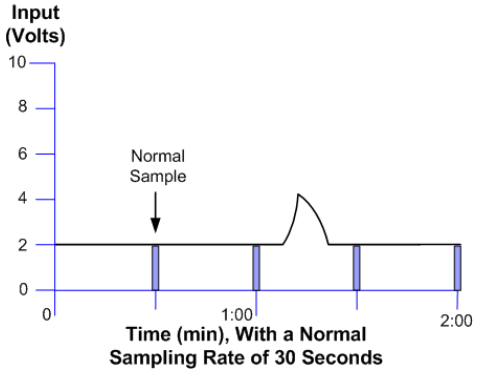


Figure 6.2: Incorrect Sampling Rate

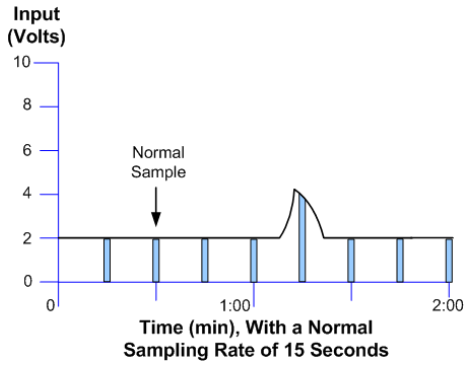


Figure 6.3: Correct Sampling Rate

In order to properly set the Normal Sampling Rate, determine how often updates are needed from the Transmitter when the process being monitored is operating under normal conditions. The Transmitter has a selectable range of 1-5, 10, 15, 20, 30, and 60 seconds depending on the Normal Transmission Rate. The factory default is 1 second. However, the more frequently the Transmitter wakes up to check the monitored device, the faster you will use up the battery life of the Transmitter.

Figure 6.2 is an example of what happens when the Normal Sampling Rate is too slow for the process being monitored. Notice how the rise in the voltage level falls between two normal samples, and thus goes completely undetected.

Figure 6.3 is an example of what happens when the Normal Sampling Rate is correctly set for the device that is being monitored. Notice how this setting makes it possible to sample the rise in the voltage level.

Once you have decided on the proper Normal Sampling Rate, follow the Transmitter menu map shown in Figure 6.4 to select this setting. The factory default is 1 second.

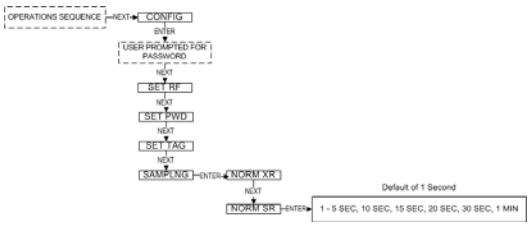


Figure 6.4: Menu Map to Normal Sampling Rate Setting

Using Wireless Management Toolkit

If you have the Wireless Management Toolkit software this menu option will not be accessible via the Transmitter once the Transmitter detects that the software is being used (See Appendix A for more details). An explanation of how to select the Normal Sampling Rate using the Wireless Management Toolkit software can be found in section 6.7.

** Indicates that Menu is Disabled if Wireless Management Toolkit is detected. (See Appendix A)*

6.3: Selecting the Abnormal Transmission Rate*

NOTE

If the device is not configured to check for abnormal process conditions using the Sampling Bands, the Abnormal Transmission Rate is not used and this section can be ignored.

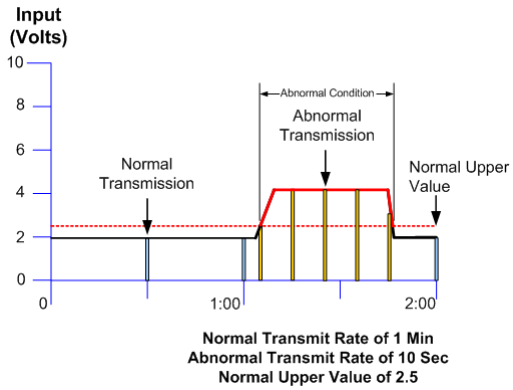


Figure 6.5: Example of Abnormal Transmission Rate Setting

The **Abnormal Transmission Rate** is identical to the Normal Transmission Rate with one exception. The Abnormal Transmission Rate only applies while the Transmitter is in an abnormal condition (see Section 6.6 Selecting the Normal Upper and Lower Values). This allows an increase or decrease in the frequency of information you receive depending on the operating conditions of the process being monitored.

In order to properly set the Abnormal Transmission Rate, determine how often updates are needed from the Transmitter when the process being monitored is operating under normal conditions. The Transmitter has a selectable range of 1-5, 10, 15, 20, 40 seconds and 1 minute. Figure 6.5 is an example of how the device switches transmission rates from Normal Transmission Rate to Abnormal Transmission Rate. Note how the first abnormal transmission is sent immediately when the Normal Upper Value set point is exceeded. The next transmission will then follow this immediate transmission by 10 seconds (or whatever the Abnormal Transmission Rate is set to). The transmissions will continue at this interval until the process value drops below the Normal Upper Value set point.

Once the process value drops below this set point, another transmission is sent to the Base Radio. The transmissions will then be sent at the Normal Transmission Rate of one minute (the current setting for the Normal Transmission Rate) from the time of the last abnormal transmission.

The user should also note that the transmission time depends on the sampling rate, and when the process value is sampled. If the Normal Sampling Rate is 30 seconds, then the process value may be above the Normal Upper Value for up to 29 seconds before an abnormal condition is detected. This means that the transmission could be as late as 29 seconds after the process value exceeded the Normal Upper Value.

Once you have decided the proper time for the Abnormal Transmission Rate, follow the Transmitter menu map shown in Figure 6.6.

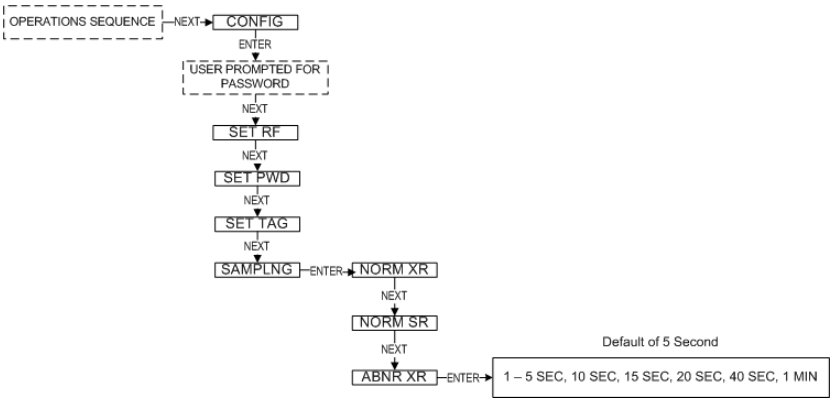


Figure 6.6: Menu Map to Abnormal Transmission Rate Setting

Using Wireless Management Toolkit

If you have the Wireless Management Toolkit software this menu option will not be accessible via the Transmitter once the Transmitter detects that the software is being used (See Appendix A for more details). An explanation of how to select the Abnormal Transmission Rate using the Wireless Management Toolkit software can be found in section 6.7.

** Indicates that Menu is Disabled if Wireless Management Toolkit is detected. (See Appendix A)*

6.4: Selecting the Abnormal Sampling Rate*

NOTE

If the device is not configured to check for abnormal process conditions using the Sampling Bands, the Abnormal Sampling rate is not used and this section can be ignored.

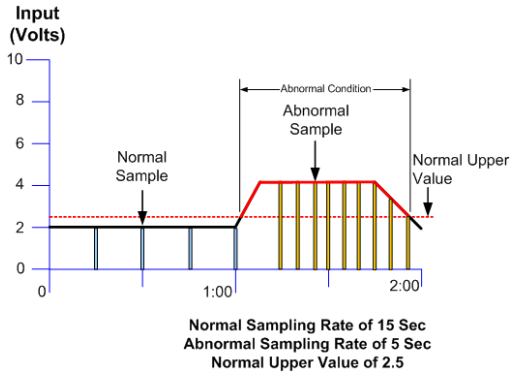


Figure 6.7: Example of Abnormal Sampling Rate Setting

The **Abnormal Sampling Rate** is identical to the Normal Sampling Rate with one exception. The Abnormal Sampling Rate only applies while the Transmitter is in an abnormal condition (see 6.6 Selecting the Normal Upper and Lower Values). This allows an increase or decrease of the frequency of information you receive depending on the operating conditions of the process being monitored.

In order to properly set the Abnormal Sampling Rate, determine how often updates are needed from the Transmitter when the process being monitored is operating under normal conditions. The Transmitter has a selectable range of 1-5, 10, 15, 20, 40 seconds and 1 minute. Figure 6.7 is an example of how the device switches sampling methods from Normal Sampling Rates to Abnormal Sampling Rates. Note how the first abnormal sample is taken a few seconds after the Normal Upper Value set point is exceeded. The next sample will then follow this sample by 5 seconds (or whatever the Abnormal Sampling Rate is set to). These samples will continue at this interval until the process value drops below the Normal Upper Value set point.

Once the process value drops below this set point the sampling rate will return to the Normal Sampling Rate. Also, the Abnormal Sampling must be equal to or faster than the Abnormal Transmission Rate.

The user should also note that the transmission time depends on the sample rate, and when the process variable is sampled. If the Normal Sampling Rate is 30 seconds, then the process variable may be above the Normal Upper Value for up to 29 seconds before abnormal condition is detected. This means that the transmission could be as late as 29 seconds after the process variable exceeded the Normal Upper Value.

Once you have decided the proper time for the Abnormal Sampling Rate follow the Transmitter menu map shown in Figure 6.8.

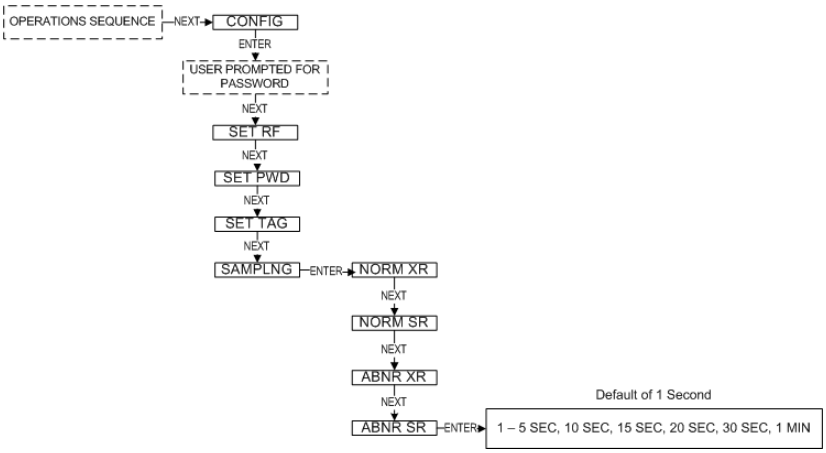


Figure 6.8: Menu Map to Abnormal Sampling Rate Setting

Using Wireless Management Toolkit

If you have the Wireless Management Toolkit software this menu option will not be accessible via the Transmitter once the Transmitter detects that the software is being used (See Appendix A for more details). An explanation of how to select the Abnormal Sampling Rate using the Wireless Management Toolkit software can be found in section 6.7.

** Indicates that Menu is Disabled if Wireless Management Toolkit is detected. (See Appendix A)*

6.5: Setting the Smart Rate Threshold*

The Smart Rate is a feature used to trigger radio transmission of the measured data sooner than the normal or abnormal rate specified by the user. This feature is used to construct a more accurate graph of the measured process value vs. time than is possible with the fixed transmission rates, while using less battery power.

To configure the **Smart Rate Threshold** follow the user menu to the SMART R menu and press the ENTER button. The user is then asked to enter the amount that the process variable must change since the last data sample, in order to trigger a new transmission of the process variable.

If the process value changes by more than the entered Smart Rate amount within the normal or abnormal sampling rate (whichever is active), then the process variable is transmitted immediately. The normal/abnormal transmit clock is then reset upon this transmission. If no Smart Rate amount exceeding change takes place in the next normal/abnormal sample then the next transmission will be the normal/abnormal transmit rate period.

The amount entered is in the same units as were selected by the user to be displayed on the Transmitter. If the measured process value does not change by more than the entered Smart Rate amount within the time between the sampling rate (whichever is active), then the process value is transmitted on the next transmit rate.

If changes in the process value, which exceed the Smart Rate Amount, continue to occur, the process value is transmitted repeatedly.

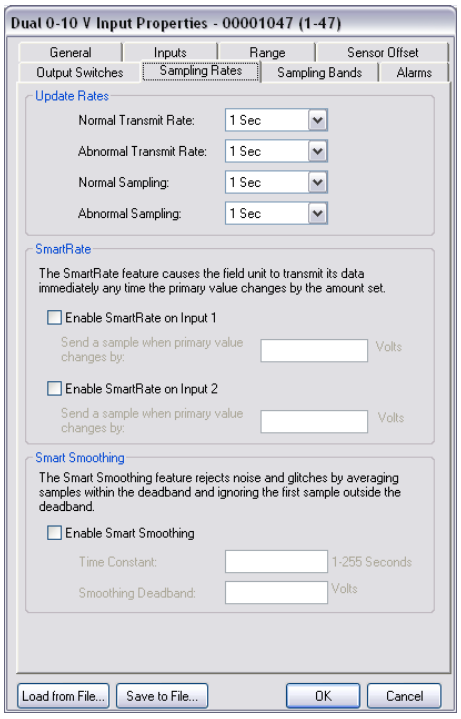


Figure 6.9: Smart Rate Configuration Using Wireless Management Toolkit

If you have the Wireless Management Toolkit software, this menu option will not be accessible via the Transmitter once the Transmitter detects that the software is being used (See Appendix A for more details). The Smart Rate should be enabled using the Wireless Management Toolkit software. To do so, enter the configuration menu (See Section 9.2 of the Wireless Management Toolkit User Manual). Once in the configuration menu click on the **Sampling Rates** tab to bring up the sampling rate information as shown in Figure 6.9.

To enable the Smart Rate, click the check-box labeled **Enable SmartRate** for the correct input. The user will then be allowed to enter a “delta”, or amount changed, value which will trigger a transmission.

Once a value has been entered, click **OK** to save and download the configuration changes to the Transmitter.

** Indicates that Menu is Disabled if Wireless Management Toolkit is detected. (See Appendix A)*

6.6: Selecting the Normal Upper and Lower Values*

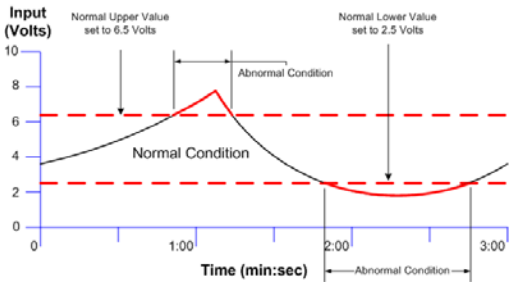


Figure 6.10: Normal Upper and Lower Value Example

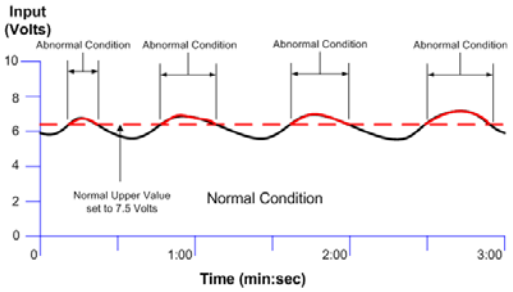


Figure 6.12: Condition "Chatter" Without Time Deadband

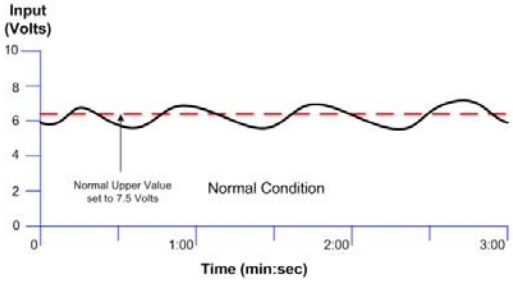


Figure 6.13: Condition "Chatter" Elimination Due to Time Deadband

Using Wireless Management Toolkit

Each Temperature Transmitter is equipped with an temperature level upper and lower value. As the temperature is measured, it is compared to a set threshold value. Depending upon the setting of that value, whether it is enabled or not, and what the time deadband is, the Transmitter will enter an Abnormal condition as seen in Figure 6.10.

The Normal Upper Value would be an indication that the temperature is 'high' and the Normal Lower Value would be an indication that temperature is 'low'. Thus the normal operating condition for the temperature application would be found in between the two Normal Values. To configure the values, follow the Transmitter menu map shown in Figure 6.11.

Figure 6.11: Menu Map to Normal Upper and Lower Value Settings

When configuring the Normal Values you will first be prompted to enable the input. You should only disable an input if it will not be used.

Once an input has been enabled, the user may enter a Normal Upper Value, Normal Lower Value, and the Smart Rate Threshold (see Section 6.5). If, for example, the Normal Upper Value is enabled, the next prompt you will receive is –XX.XX for the process variable value. Increment this value to the desired value and press the ENTER button. (The "-" may be toggled on and off as well).

The final prompt you will receive is the Time Deadband prompt. The Time Deadband refers to the number of seconds that the measured reading must stay in a certain condition before the Transmitter will actually switch to that condition. To select a proper Time Deadband, consider the example in Figure 6.12. Notice that the Transmitter continues to cycle from Normal to Abnormal Conditions due to the fact that the input value is fluctuating around the 7.5 Volt Normal Upper Value. This is undesired. The addition of a few second delay before the Transmitter switches conditions will eliminate this "chatter", as seen in Figure 6.13.

If you have the Wireless Management Toolkit software this menu option will not be accessible via the Transmitter once the Transmitter detects that the software is being used (See Appendix A for more details). An explanation of how to select the Abnormal Sampling Rate using the Wireless Management Toolkit software can be found in section 6.7.

** Indicates that Menu is Disabled if Wireless Management Toolkit is detected. (See Appendix A)*

6.7: Selecting Rates, Thresholds, and Deadbands via the Software

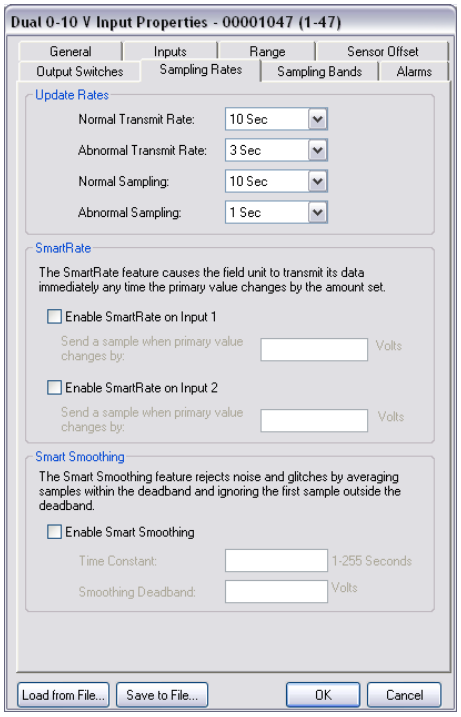


Figure 6.14: Sampling and Transmission Rate Selection Using the Software

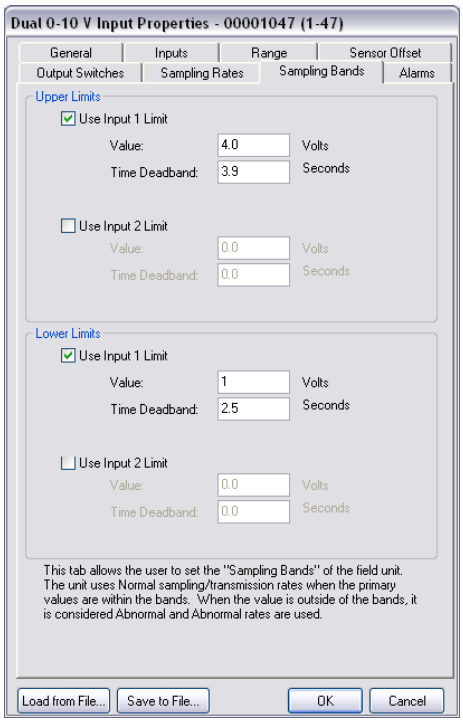


Figure 6.15: Normal Upper and Lower Value Selection Using the Software

If you have the Wireless Management Toolkit software the Normal and Abnormal Sampling and Transmission menu options will not be accessible via the Transmitter once the Transmitter detects that the software is being used (See Appendix A for more details). These settings should be entered using the Wireless Management Toolkit software. To do so, enter the configuration menu (See Section 9.2 of the Wireless Management Toolkit User Manual). Once in the configuration menu click on the **Sampling Rates** tab to bring up the sampling rate information, as shown in Figure 6.14.

To select the Normal Transmission Rate, select one of the time periods from the drop box. Next, select an Abnormal Transmission Rate in the same manner. Note that the Normal and Abnormal Transmission Rate can be the same.

Once the transmission rates have been selected, the user should select the desired sampling rates. Note that the sampling rate must be equal to or faster than the associated transmit rate. For example, in Figure 6.14 the Normal Transmission Rate is set to 10 seconds and the Normal Sampling Rate is also set to 10 seconds. This is a valid configuration. Another example in Figure 6.14 is the Abnormal Transmission Rate being set to 3 seconds and the Abnormal Sampling Rate being set to 1 second.

If you incorrectly enter the Transmission and Sampling Rates, a message will be displayed explaining this. You will not be allowed to enter an incorrect setting.

Using Wireless Management Toolkit

If you have the Wireless Management Toolkit software the Normal and Normal Upper and Lower Value menu options will not be accessible via the Transmitter once the Transmitter detects that the software is being used (See Appendix A for more details). These settings should be entered using the Wireless Management Toolkit software. To do so, enter the configuration menu (See Section 9.2 of the Wireless Management Toolkit User Manual). Once in the configuration menu click on the **Sampling Bands** tab to bring up the sampling band information as shown in Figure 6.15.

To set a limit to the normal condition, enable the limit by clicking on the **Use Input X Limit** check box. Then enter the value and time deadband for the limit (for more details see Section 6.6 of this manual).

Configuring the Process Variable

This section helps the user in the selection of engineering units, as well as discussing the setting of a measurement offset, selecting the sensor type, and trimming the process measurement. The subsections are as follows:

7.1: Selecting Units of Measure
7.2: Selecting the Sensor Type
7.3: Setting a Measurement Offset
7.4: Trimming the Measurement
7.5: Entering a 22-Point Curve

7.1: Selecting Unit of Measure*

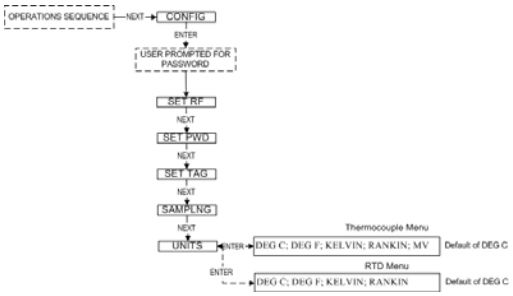


Figure 7.1: Menu Map to Units Setting

The Transmitter can be used in many different types of applications. To accommodate these various options, there are various engineering units that can be selected.

Please note that the units selected apply to both Input 1 and Input 2. Each input may not use different units.

To select units of measurement, follow the Transmitter menu map shown in Figure 7.1. The factory default units is Degrees C.

If you have the Wireless Management Toolkit software this menu option will not be accessible via the Transmitter once the Transmitter detects that the software is being used (See Appendix A for more details). The process variable units should be entered using the Wireless Management Toolkit software. To do so, enter the configuration menu (See Section 9.2 of the Wireless Management Toolkit User Manual). Once in the configuration menu click on the **General** tab to bring up the general information.

To select the units, click the drop down box labeled **Input Units**. Select units you wish to use from the available list.

Once a valued has been entered, click **OK** to save and download the configuration changes to the Transmitter.

7.2: Selecting the Sensor Type

Figure 7.2: Menu Map to Sensor Selection Setting

Depending on the type of thermocouple or RTD the user intends to employ for temperature measurement, the sensor setting must be set to the corresponding sensor type.

For a Thermocouple Transmitter the factory default is a J thermocouple. In the case of a WT531T this setting refers to both thermocouple inputs. Thus, two different thermocouple types cannot be wired into the same Transmitter.

For a RTD Transmitter the factory is a 4 wire DIN platinum sensor.

To select the sensor type, follow the Transmitter menu map shown in Figure 7.2.

** Indicates that Menu is Disabled if Wireless Management Toolkit is detected. (See Appendix A)*

7.3: Setting a Measurement Offset

For various applications, the user may wish to display an offset value rather than the actual value. To enter an offset, navigate to the OFFSET command, as shown in Figure 7.3, select the desired input to be offset. Then enter the offset to be added or subtracted from the actual measured value.

Figure 7.3: Menu Map to Offset Setting

7.4: Trimming the Measurement

The Transmitter interface allows you to set a two-point correction curve for the sensor. This process is often called "trimming" because the displayed value is trimmed up or down to reflect the actual value being applied.

To set a trim point, take the Transmitter offline and navigate to the TRIM menu, as shown in Figure 7.4, and select the input to be trimmed. Then select the point you wish to enter. After selecting the point, you will have the option to trim the device or reset the trim. If NEW TRIM is selected, you will be prompted to enter the lower point first. Type the value and press ENTER. The Transmitter will prompt you to apply the indicated process value to the Transmitter. Apply the process value and press ENTER. Repeat the process for the higher point. After both points have been trimmed, you can choose to save or discard the new trim.

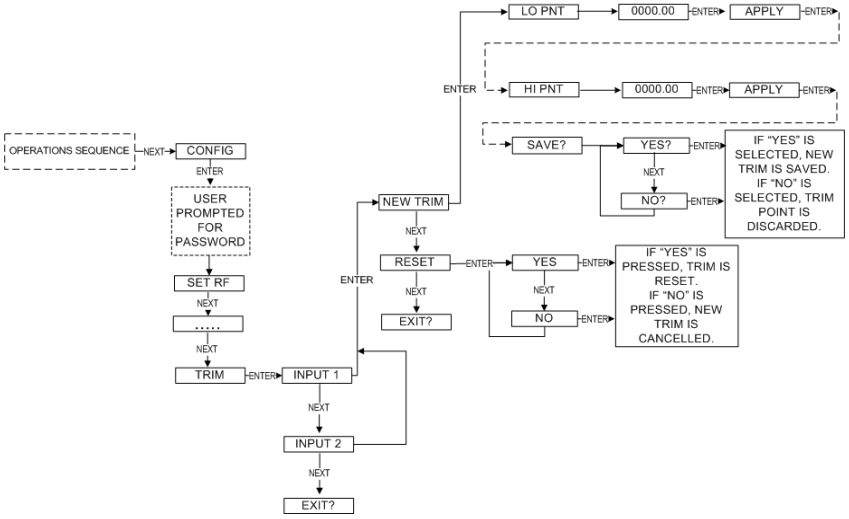


Figure 7.4 Menu Map to Trim Setting

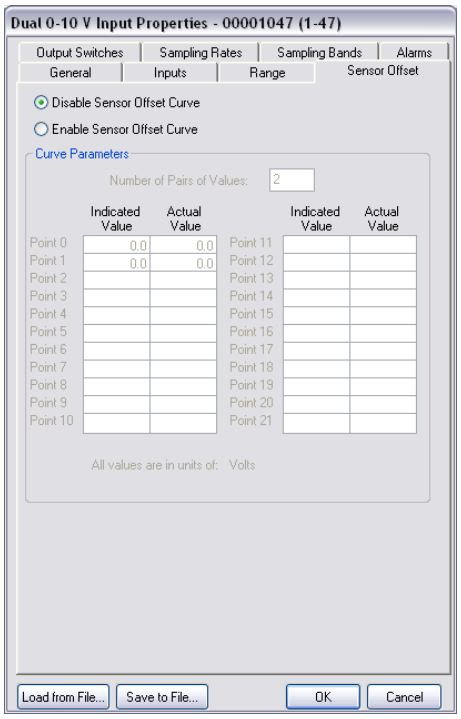


Figure 7.5: Setting a 22-Point Curve Using Wireless Management Toolkit

NOTE

If entering a two-point trim via the NEXT and ENTER buttons, Point 2 **MUST** be greater than Point 1 in order for the trim to work properly.

7.5: Entering a 22-Point Curve

If you have the Wireless Management Toolkit software, a 22-point sensor offset curve may be entered for the Transmitter. To do so, enter the configuration menu (See Section 9.2 of the Wireless Management Toolkit User Manual). Once in the configuration menu click on the **Sensor Offset** tab to bring up the offset information as shown in Figure 7.5.

Maintaining the Transmitter

The Transmitter is extremely easy to maintain in that it requires no periodic calibration or system checks. The Transmitter has a self diagnostic which is constantly checking the internal system. If any errors are found, they are reported via the LCD, Base Radio, or the software. A simple yearly visual inspection for the following is all that is needed:

- Is the Transmitter still securely fastened to the equipment being monitored?
- Are there any visible corrosions, cracks or residue build-ups on the unit?
- Has anything about the application changed from the original intended use?

8.1: Changing the Battery

Caution

Explosions may result in death or serious injury. Do not remove the instrument cover or open wiring housing in explosive atmospheres when power and communications are on. Instead, power-down the Transmitter and communications, ventilate the atmosphere as much as possible, then proceed to open the instrument cover and replace the battery.

Warning

The replacement battery **MUST** be a Lithium Inorganic Battery (non-rechargeable). Size C— 3.6Volts, Tadiran TL-2200.

Use of a different battery will **VOID** the intrinsic safety rating of this device and may result in an explosion!

Caution

When replacing the battery, the positive end of the battery clip is the end with the red wire. Putting the battery in backwards will blow a fuse!

The battery will need to be changed within one month of seeing a 'LOW BAT' message on either the Transmitter or in WMT. This is a simple process:

1. Make sure you have the correct replacement battery:

   Lithium Inorganic Battery (non-rechargeable)
   Size "C" – 3.6Volts
   - Tadiran TL-2200

2. Simultaneously press and hold the NEXT and ENTER buttons to power down the Transmitter. Then enter the password.
3. Remove the 4 set screws on the sides of the Transmitter housing with a standard screwdriver.
4. Remove the housing and locate the battery. Warning! When removing the housing do not twist or bend the green flex cable! Doing so may cause the tether to improperly seat next to the antenna and greatly reduce operable RF distances. Do not allow the housing to flop around while hanging by the tether.
5. Remove the old battery and replace it with the new battery, positive end first. (Note that the positive end of the battery clip is the end with the red wire).
6. Replace the housing and screw the housing back on. Power up the unit by pressing and holding both the NEXT and ENTER buttons for a few seconds.
7. Properly dispose of the used battery.

Technical Specifications

T/C Input Characteristics

- RTD and Thermocouple linearization to ± .05 °C.± 0.1 % of Full-scale Reading Plus 1.8 °F (1 °C) for Thermocouple Cold-junction
    - Effect at Reference Conditions (unit should be powered for 1-5 minutes for best accuracy)
- ± 0.002 % of reading per °C for Ambient Temperature Effect (RTD)
- ± 0.01 % of reading per °C for Ambient Temperature Effect (Thermocouple)
- Stability deviation per year is less than 0.025 %
- T/C accepts thermocouple types: B, C, E, J, K, L, N, R, S, T, U
- Note: For Dual T/C installations, the inputs share a common ground (-). Use Ungrounded T/C's or ensure that both T/C's are at the same ground potential to avoid ground loop effects.

Local Input Switch Characteristics (WT531T/WT531R only) (Simple Device Closure Only) Optional

- Number of Channels: TC-2 RT-1
- Max External Switch Impedance Applied: 1 KOhm
- Isolation: 110 KOhms (between output (-) and input (-))
- Connector: Wire size 28-16 AWG
- **For simple device monitoring only!** (i.e., contact closures)

RF Characteristics

- 902 MHz – 928 MHz Frequency Hopping Spread Spectrum, FCC certified ISM license-free band
- Up to 3000' range from Base Radio with clear line of sight;

Operating Temperature Range

- -40 °F to +185 °F (-40 °C to +85 °C) electronics
- -4 °F to +158 °F (-20 °C to +70 °C) display (full visibility)
- -40 °F to +185 °F (-40 °C to +85 °C) display (with reduced visibility)

Physical Characteristics

- Aluminum junction box
- GE Lexan® cover. V-0 rating and UV stable

Operating Vibration and Shock Characteristics

- Certified per IEC 60068-2-6 (vibration) and 2-27 (shock)

Random Vibration Characteristics

- Certified to withstand 6 g's, 15 minutes per Axis from 9 – 500 Hz

Electromagnetic Compatibility (CE Compliance)

- Operates within specification in fields from 80 to 1,000 MHz with Field strengths to 10 V/m. Meets EN 50082-1 general immunity standard and EN 55011 emissions standard.

Certifications

- Rated for industrial use -40°F to 185°F (-40°C to 85°C)
- FM and CSA Enclosure Type 4
- FM Approved Intrinsically Safe for Classes I/II/III, Division 1, Groups A,B,C,D,E,F&G; Class I Zone 0, AEx ia IIC T4 Ta = 85ºC per 50001377; Class I, Division 2, Groups A,B,C,D; Suitable for Class II and III Division 2, Groups F & G; Class I, Zone 2, AEx nA IIC T4 Ta = 85ºC per 50001377; Enclosure Type 4
- CSA Certified Intrinsically Safe, Class I, Div 1, Groups A, B, C & D; Class II, Div 1, Groups E, F & G; Class III, Div 1; Ex ia IIC; Class I, Zone 0; T4 Ta = 85ºC; Enclosure Type 4; Class I, Div 2, Groups A, B, C & D; Class II, Div 2, Groups F & G; Class III; T4 Ta = 85ºC; Enclosure Type 4.

Technical Specifications (continued)

Certifications (continued)

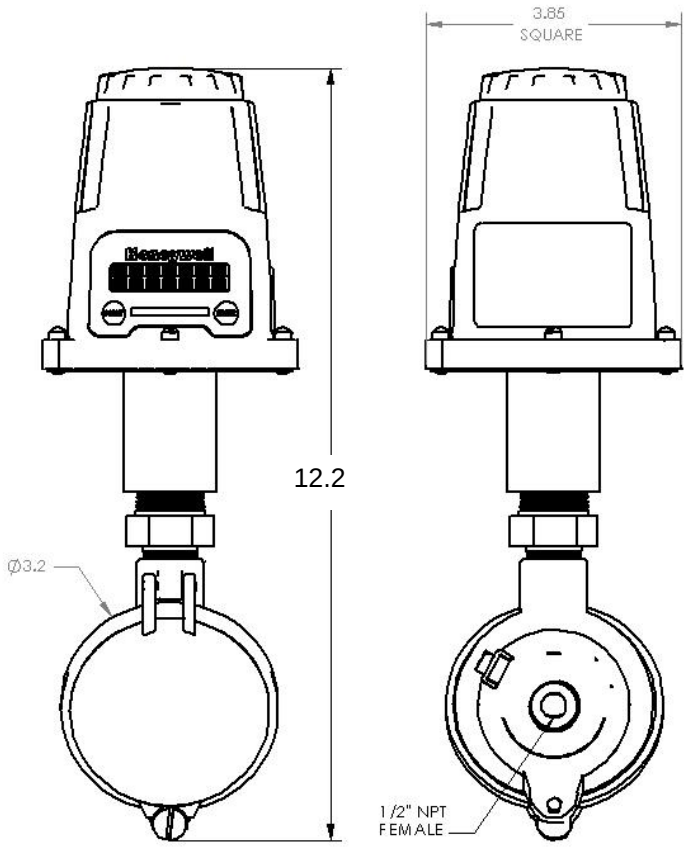
- ATEX
  - ◊ Intrinsically Safe “ ia “ : SIRA 06ATEX2021X

    II 1G Ex ia IIC T4 Ga (Ta = -40°C to +65°C)

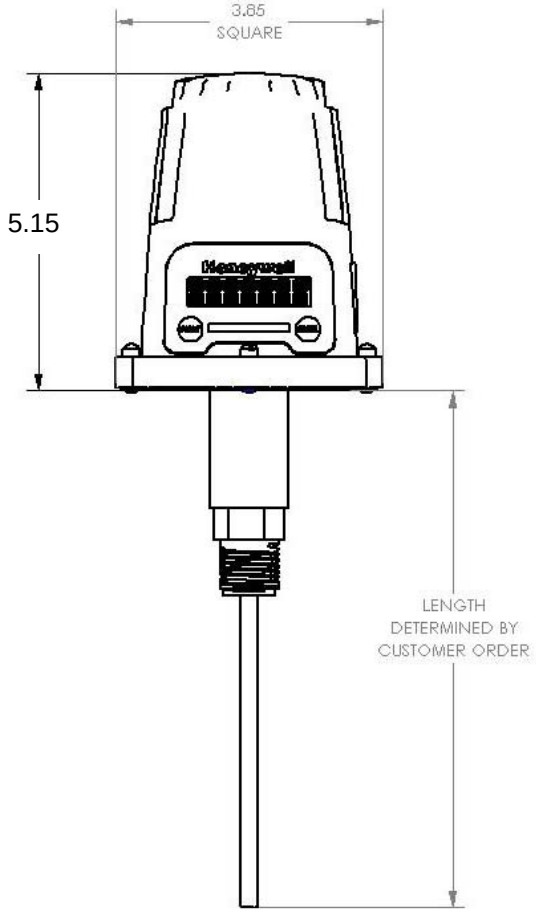
  - ◊ Intrinsically Safe “ic“: HON 06.0201

    II 3G Ex ic IIC T4 Gc (Ta = -40°C to +65°C)

Split Architecture
WT531R and WT531T



Integrated Architecture
WT532R and WT532T



Dimensioned Mechanical Drawings

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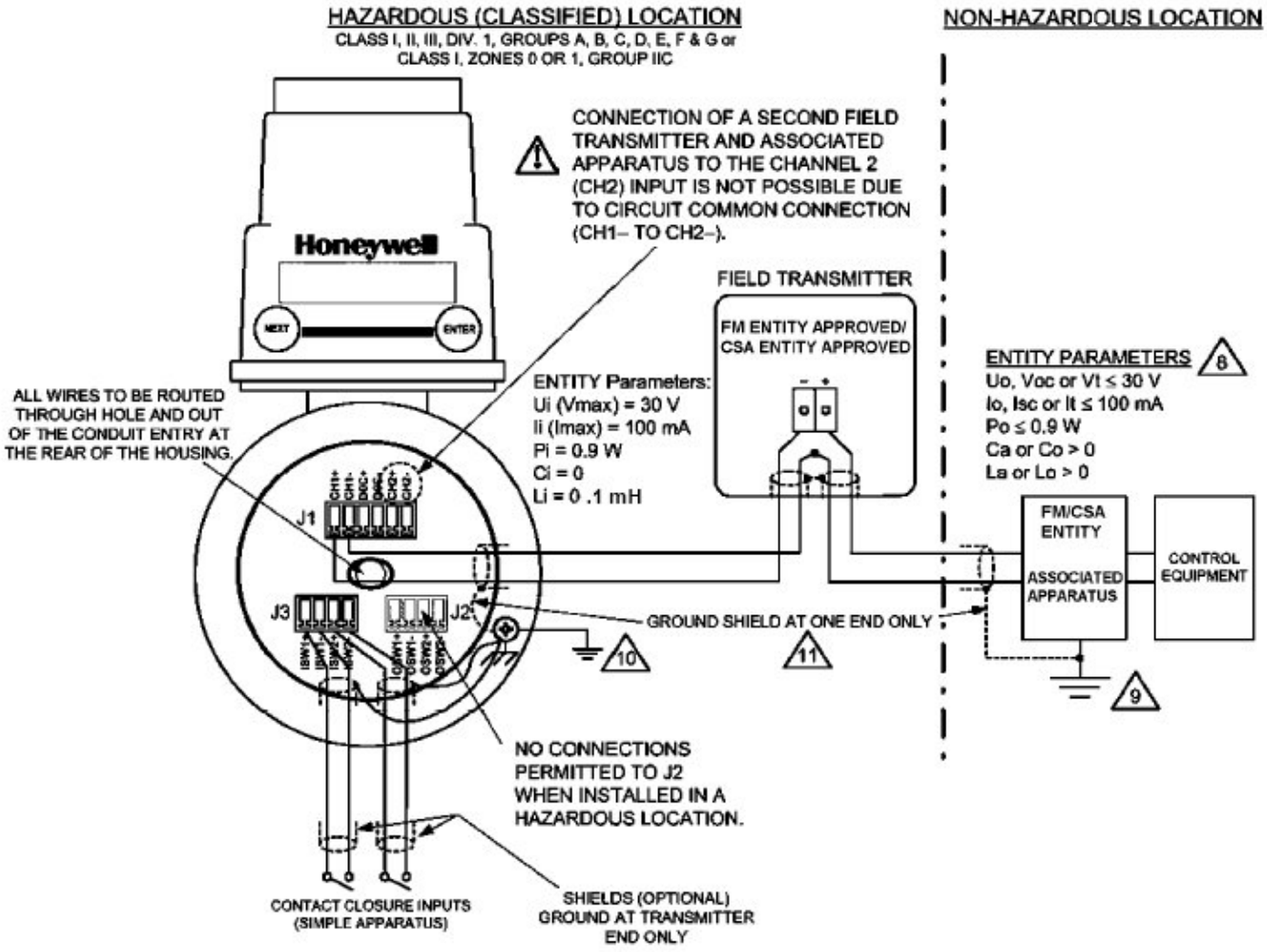
PRE REL		
ISS	REVISION & DATE	APPD
F	REVISED 12/17/08 0046934	WF

FM APPROVED & CSA CERTIFIED INSTRINSICALLY SAFE INSTALLATION CONTROL DRAWING

XYR 5000, MODEL WI 551 4–20 mA ANALOG INPUT & DUAL CONTACT CLOSURE INPUT


HAZARDOUS (CLASSIFIED) LOCATION
CLASS I, II, III, DIV. 1, GROUPS A, B, C, D, E, F & G or
CLASS I, ZONES 0 OR 1, GROUP IIC
NON-HAZARDOUS LOCATION
CONNECTION OF A SECOND FIELD TRANSMITTER AND ASSOCIATED APPARATUS TO THE CHANNEL 2 (CH2) INPUT IS NOT POSSIBLE DUE TO CIRCUIT COMMON CONNECTION (CH1– TO CH2–).
FIELD TRANSMITTER
FM ENTITY APPROVED/
CSA ENTITY APPROVED
ENTITY PARAMETERS 8
Uo, Voc or Vt ≤ 30 V
Io, Isc or It ≤ 100 mA
Po ≤ 0.9 W
Ca or Co > 0
La or Lo > 0
ENTITY Parameters:
Ui (Vmax) = 30 V
Ii (Imax) = 100 mA
Pi = 0.9 W
Ci = 0
Li = 0 .1 mH
ALL WIRES TO BE ROUTED THROUGH HOLE AND OUT OF THE CONDUIT ENTRY AT THE REAR OF THE HOUSING.
Honeywell
NEXT
ENTER
J1
J2
J3
FM/CSA ENTITY
ASSOCIATED APPARATUS
CONTROL EQUIPMENT
GROUND SHIELD AT ONE END ONLY
10
11
9
NO CONNECTIONS PERMITTED TO J2 WHEN INSTALLED IN A HAZARDOUS LOCATION.
CONTACT CLOSURE INPUTS (SIMPLE APPARATUS)
SHIELDS (OPTIONAL) GROUND AT TRANSMITTER END ONLY

MASTER FILE TYPE: MS WORD

CERTIFICATION DOCUMENT				Honeywell		
ENGINEERING CHANGE ORDERS (ECOs) MUST BE AUTHORIZED BY APPROVALS ENGINEERING	DRAWN	WF	021804	FM & CSA Control Drawing XYR 5000 Wireless Transmitters		
	CHECKED					
	DEV ENG	NOTE 15				
	MFG ENG					
	QA ENG			A/A4	50001377	
	TOLERANCE UNLESS NOTED ANGULAR DIMENSION			SCALE	USED ON	SH.1 OF 5

FM APPROVED & CSA CERTIFIED INSTRINSICALLY SAFE INSTALLATION CONTROL DRAWING

NOTES:

1. Intrinsically safe installation shall be in accordance with ANSI/NFPA 70, NEC® Articles 504 and 505 for the USA, the Canadian Electrical Code (CEC), part I, Section 18 for Canada, and ANSI/ISA RP12.6.
2. FM or CSA ENTITY approved apparatus shall be installed in accordance with the manufacturer's Intrinsic Safety Control Drawing or shall be Simple Apparatus. Simple Apparatus are devices that will neither generate nor store more than 1.2V, 0.1A, 25mW, or 20μJ, such as switches, thermocouples, and RTDs.
3. The Intrinsic Safety ENTITY concept allows the interconnection of two ENTITY Approved Intrinsically safe devices with ENTITY parameters not specifically examined in combination as a system when: Uo or Voc (or Vt in the USA) ≤ Ui or Vmax, Io or Isc (or It in the USA) ≤ Ii or Imax, Ca or Co ≥ Ci + Ccable, La or Lo ≥ Li + Lcable, Po ≤ Pi. Where two separate barrier channels are required, one dual-channel or two single-channel barriers may be used, where in either case, both channels have been Certified for use together with combined entity parameters that meet the above equations.
4. System Parameters: XYR 5000 and Field Transmitter Vmax ≥ Voc (or Vt in the USA), Imax ≥ Isc (or It in the USA); XYR 5000 Ci + Field Transmitter Ci + Ccable ≤ Ca, XYR 5000 Li + Field Transmitter Li + Lcable ≤ La.
5. When the electrical parameters of the cable are unknown, the following values may be used: Capacitance – 197pF/m (60 pF/ft), Inductance – 0.66μH/m (0.020 μH/ft).
6. For Class II and Class III installations where rigid metal conduit is not used, seal cable entries against dust and fibers using a NRTL listed cable gland fitting.
7. Control equipment that is connected to Associated apparatus must not use or generate more than 250 V.
8. Associated apparatus must be FM ENTITY listed in the USA and CSA Certified under the ENTITY Concept in Canada. Associated apparatus may be installed in a Class I, Division 2 Hazardous (Classified) location if so approved.
9. Non-Galvanically isolated apparatus (grounded Zener Barriers) must be connected to a suitable ground electrode per NFPA 70, Article 504 and 505 in the USA and CEC Part I, Section 10 in Canada. The resistance of the ground path must be less than 1.0 ohm.
10. Transmitters installed with remote field wiring connections (contact closure inputs, remote RTD, remote thermocouples, or 4-20 mA loop) shall have the enclosure grounded locally in the hazardous location.
11. Shielded two-wire cable is required for EMC conformity and is recommended for all installations. The 4-20 mA loop shield shall be grounded at the supply (barrier) end to the barrier ground bus only when grounded Zener barriers are used. The 4-20 mA loop shield shall be grounded at the transmitter end only when galvanically isolated barriers are used.
12. Divisions 1 & 2, and Zone 0: WARNING: EXPLOSION HAZARD – SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR USE IN HAZARDOUS LOCATIONS.
13. Division 2: WARNING: EXPLOSION HAZARD – DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.
14. NO REVISION OF THIS CONTROL DRAWING IS PERMITTED WITHOUT AUTHORIZATION FORM FM APPROVALS AND CSA.
15. For release approvals see ECO # 0005032.

XYR 5000	Field Transmitter	Associated Apparatus
Ui or Vmax = 30 V	Ui or Vmax ≥ Vt	Uo, Voc or Vt ≤ 30 V
Ii or Imax = 100 mA	Ii or Imax ≥ It	Io, Isc or It ≤ 100 mA
Pmax = 0.9 W	Pmax ≥ Po	$Po \leq \frac{(Voc \text{ or } Vt \cdot Isc \text{ or } It)}{4} \leq 0.9\ W$
$C_i = 0$	$C_i \leq$ Associated Apparatus Ca – Ccable – Ci of other transmitter connected to two-channel barrier.	Ca or Co > 0 nF
$L_i = 0.1$ mH	$L_i \leq$ Associated Apparatus La – Lcable – Li of other transmitter connected to two-channel barrier.	La or Lo > 0.1 mH

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Models with high-gain antennas: WA565, WA566, WA575, WA576, WG561, WG562, WG563, WG564, WG565, WG566, WL561, WL566, WL571, WL576, WI553, WI554, WT534R, WT534T, WW592.

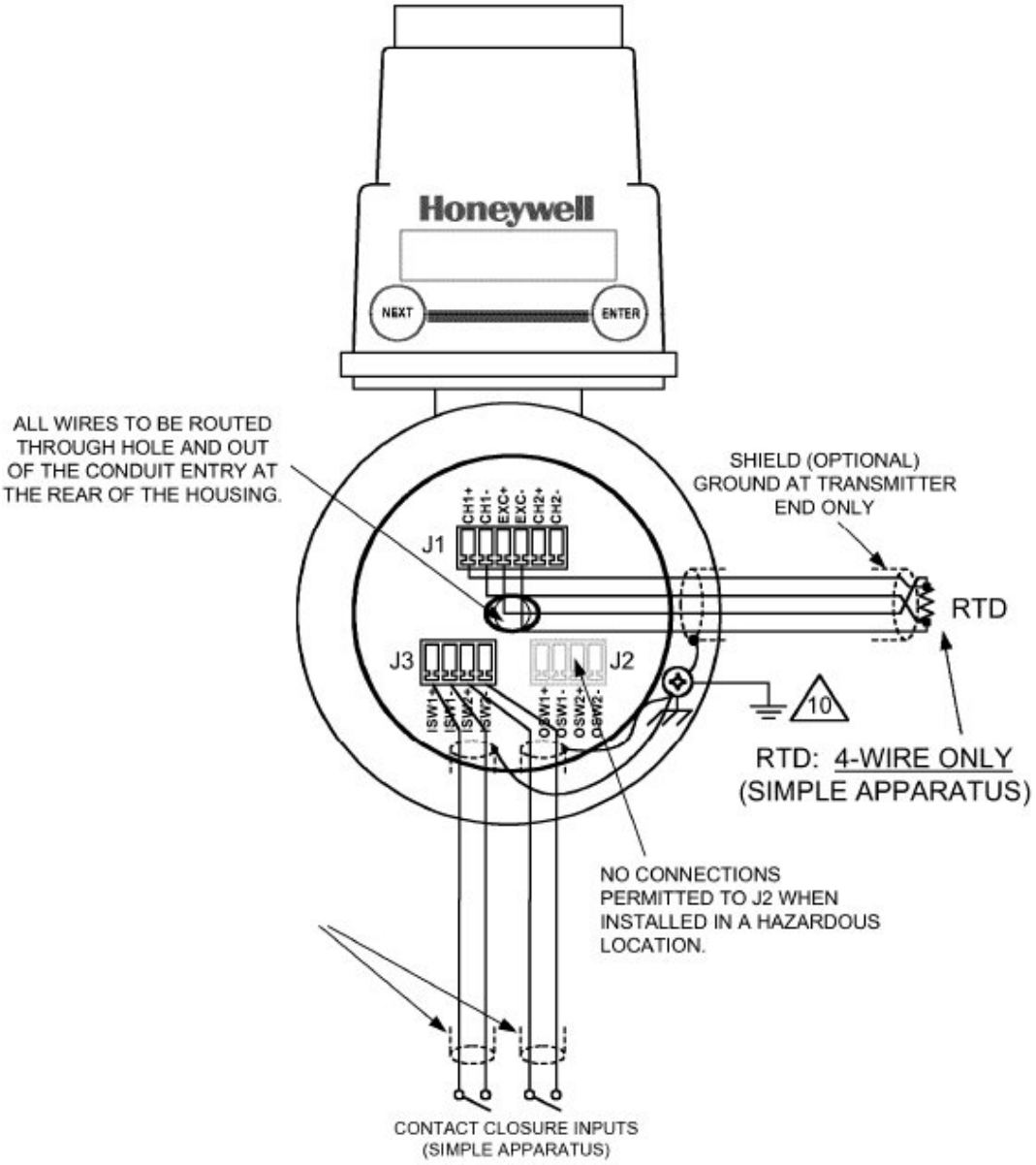
The above listed wireless transmitters include a directional high-gain antenna. The high-gain antenna may be installed remote from the XYR 5000 with the cable length not to exceed 100 ft (30m). The antenna cable shield shall be bonded to earth ground.

XYR 5000, MODEL WT 531R, REMOTE RTD INPUT & DUAL CONTACT CLOSURE INPUT

(SEE NOTE 10)

HAZARDOUS (CLASSIFIED) LOCATION

CLASS I, II, III, DIV. 1, GROUPS A, B, C, D, E, F & G or
CLASS I, ZONES 0 OR 1, GROUP IIC



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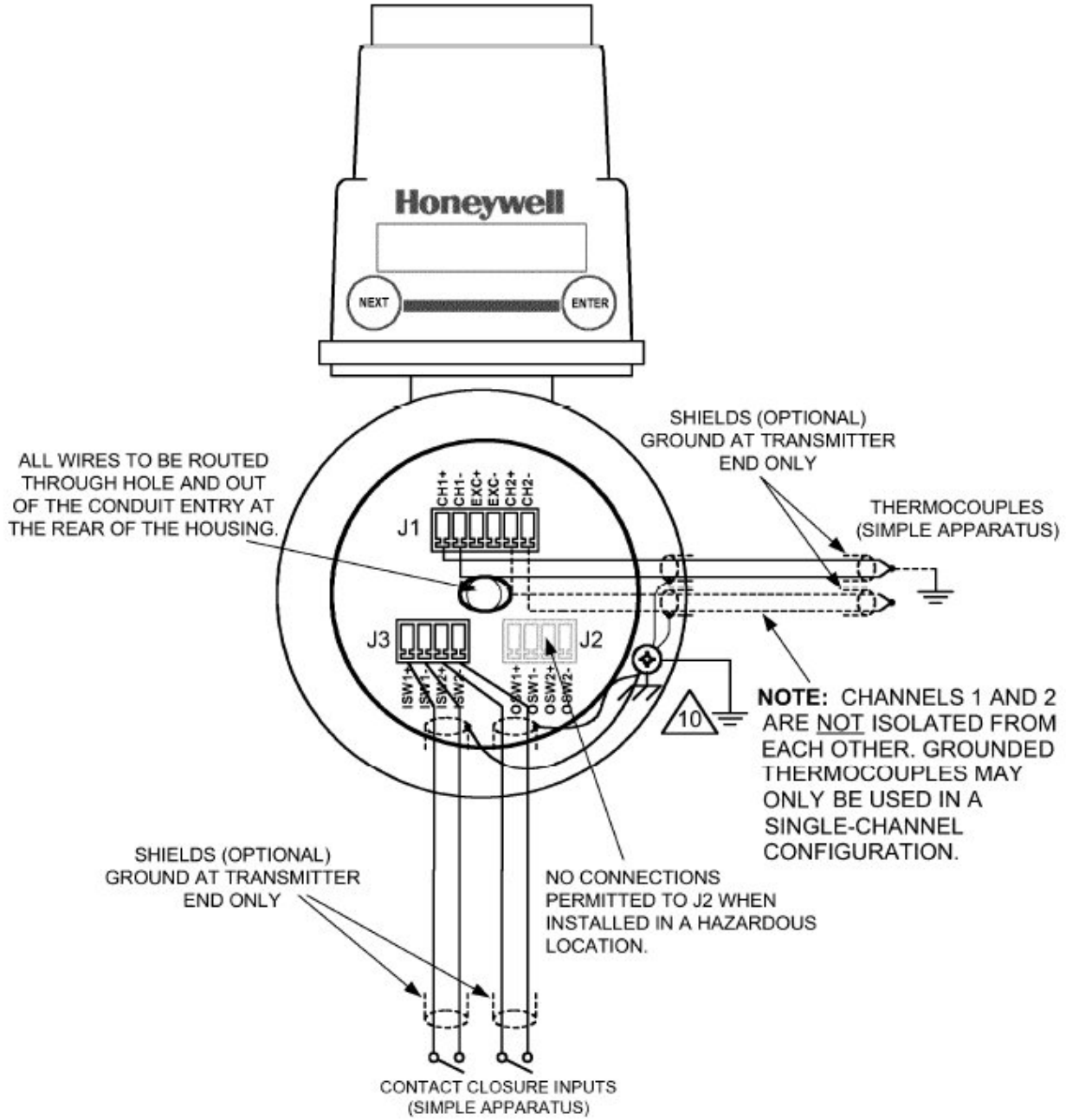
	SCALE NONE	REV F DATE 12/17/08	SH. 3 of 5

XYR 5000, MODEL WT 531T, DUAL REMOTE THERMOCOUPLE INPUT & DUAL CONTACT CLOSURE INPUT

(SEE NOTE 10)

HAZARDOUS (CLASSIFIED) LOCATION

CLASS I, II, III, DIV. 1, GROUPS A, B, C, D, E, F & G or
CLASS I, ZONES 0 OR 1, GROUP IIC



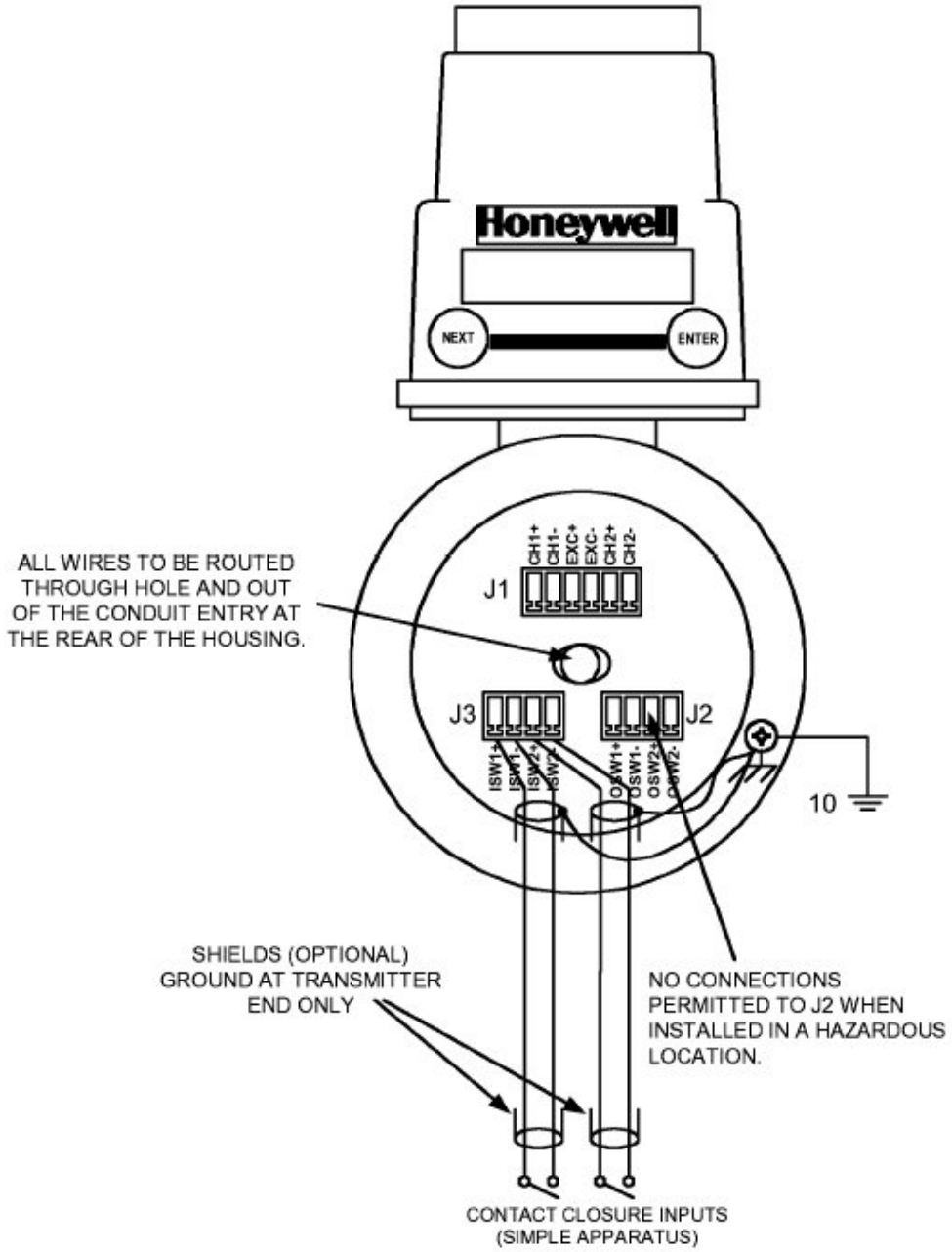
Honeywell	A/A4	50001377	
	SCALE NONE	REV F DATE 12/17/08	SH. 4 of 5

XYR 5000, MODEL WW 591 & WW592 DUAL CONTACT CLOSURE INPUT

(SEE NOTE 10)

HAZARDOUS (CLASSIFIED) LOCATION

CLASS I, II, III, DIV. 1, GROUPS A, B, C, D, E, F & G or
CLASS I, ZONES 0 OR 1, GROUP IIC



Honeywell	A/A4	50001377	
	SCALE NONE	REV F DATE 12/17/08	SH. 5 of 5

Navigating User Menus

Pressing either the NEXT or ENTER buttons located on the front of the Transmitter or Base Radio just below the Liquid Crystal Display (LCD) screen is all that is needed to navigate the respective menus. Pressing both of these buttons for one second will turn the unit on.

Pressing the NEXT button at any time while the Transmitter is cycling through the normal messages causes the Transmitter to enter the setup mode. The NEXT button is then used to step through menu options, and the ENTER button is used to enter a sub menu of what is displayed on the LCD at that time. If no button is pressed within a 30 second period, the unit goes back to the normal display mode.

If you enter a sub menu that requires a numerical input, such as 001, the left most 0 will be blinking. This indicates that pressing the NEXT button will increment this value with each press from 0 to 9 and back to 0 again. Pressing the ENTER button will move to the next available value. If the last value is blinking, pressing ENTER will save the entered values and return from the sub menu.

If both the NEXT and ENTER buttons are depressed at once, a message on the LCD displaying OFF? will appear. If both buttons are released upon appearance of this message the user will be returned to the scrolling main screen. If both buttons are not released for the duration of the OFF? message the unit will power down and turn off. Note: If the unit is turned off while entering values in a sub menu, those values will NOT be saved.

* As shown throughout the document, this mark indicates that these menu options will automatically turn off if the Wireless Management Toolkit Software is used. All changes to these Transmitter menu options should be made through software instead. This is to prevent simultaneous changes from taking place. If you wish to discontinue use of the software and want these menus re-instated, you must contact your Honeywell Sales Representative.

Transmitter Displayed Message Definitions

This section covers the various messages, displayed on the Transmitter LCD, that occur during operation of the device.

Operations Sequence

- **RF Link Status**
  - ⇒ RF OK – Transmitter and Base Radio are communicating properly
  - ⇒ RF SYNC - Transmitter and Base Radio are attempting to synchronize communications.
  - ⇒ RF OFF - Transmitter's RF Channel is set to RF OFF
  - ⇒ NO RF - Transmitter and Base Radio have no communications
- **Temperature Input Level**
  - ⇒ –XX.XX – Currently measured Temperature Input level

Error Messages

If an error is detected with the operation of the Transmitter a message will be displayed on the Transmitter LCD (a corresponding message may also appear on the Base Radio LCD).

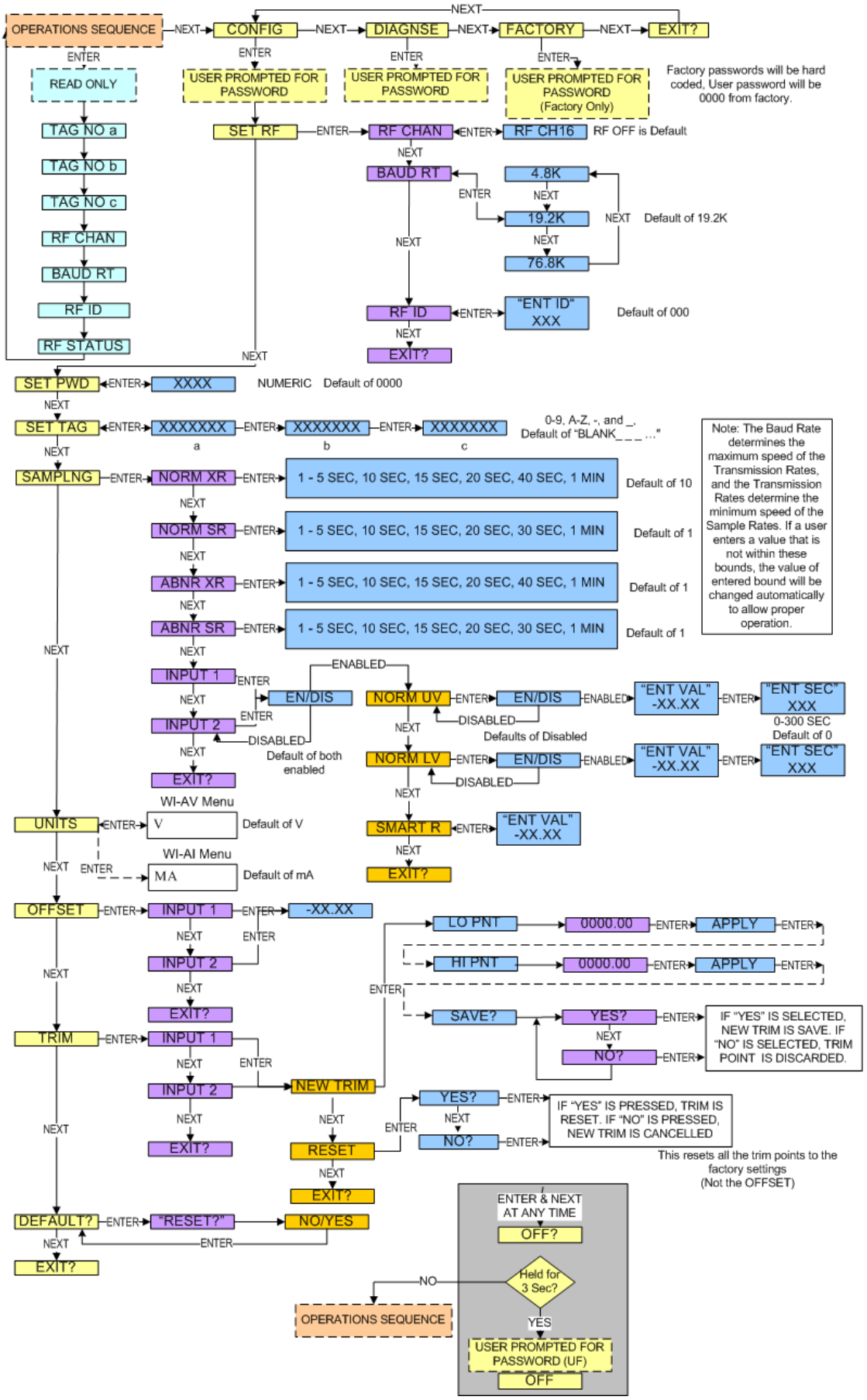
There are few types of error messages, warning and fatal. Warning messages are displayed as part of the normal cycling message sequence. These are:

- **LOW BAT** - battery should be replaced as soon as possible
- **NO RF** - cannot detect Base Radio
- **S FAULT** - there is an open sensor or excitation wire detected. Also if a sensor value goes above/below logical limits. The unit will display 9999.99 for measurement (sensor fault mode); but will continue sampling and recover if the problem desists.
- **OVERRNG** - the device is measuring a value above/below sensor dependent bound values. For example, the Analog Input device will report over-range if measurement is above 100% range of the Analog Input sensor. If the measurement goes above 150% full range, the unit will go into Sensor Fault mode. In over-range mode, the measurement continues to be displayed, with the "OVERRNG" message to remind the user that the specified range of the sensor and the calibrated range of the device is being exceeded.

Fatal error messages will replace the normal cycling message sequence and will flash. A fatal message indicates the Transmitter is no longer operating normally and requires repair. These are:

- RF ERR - fatal error within RF communications
- SEN ERR - fatal error within the sensor electronics
- SYS ERR - fatal error within the microprocessor system
- RF CAL - fatal error within the RF calibration system

Transmitter Menu Map



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